

# RESEARCH REPORT



## Skill Shortages in the Residential Construction Industry



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# **SKILL SHORTAGES IN THE RESIDENTIAL CONSTRUCTION INDUSTRY**

**(Report to the Canada Mortgage and Housing Corporation)**

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(Revised January, 2001)

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[ConstructionShortages101]

## SKILLS SHORTAGES IN THE RESIDENTIAL CONSTRUCTION INDUSTRY

The paper looks at why labour shortages arise and persist, the possible consequences of labour shortages, the tools available to manage labour supply and demand, policy implications and future research requirements.

### Why Labour Shortages Arise and Persist

The various factors affecting labour supply described in the paper can be grouped into the following categories:

#### *Economic Cycles*

- Cyclical markets make it very difficult for the industry to match labour supply with labour demand. Market fluctuations occur quickly, by the time new recruits are trained and on-site, market conditions may change, leading to labour surpluses and layoffs.
- European economies are reasonably healthy. Canada's traditional sources of immigrant labourers are staying in their home countries.
- The world economy (particularly the U.S.) has also been very healthy. Canada is just one of many countries competing for immigrant construction labourers around the world.

#### *Demographic Issues*

- The skilled trades in Canada are aging and no one replacing them.
- Construction is a male dominated industry that only exploits half the labour force.

#### *Training and Education Issues*

- There is a bias against vocational training in North America that starts with parents and school boards and carries through to government funding (government subsidies for industry-based institutions are not on a par with subsidies for colleges and universities).
- There are flaws with the apprenticeship system. Regulations that set the ratio of apprentices to journeymen can result in shortages. Narrow job classifications and occupational licensing can create bottlenecks. These issues are under provincial jurisdiction.

#### *Productivity / Competitiveness Issues*

- The residential sector is perceived as the poor cousin in the construction industry. It is sandwiched between the ICI sector, where wages are higher, and the underground economy, where more money can be made tax free. In booming markets, labour goes to the highest bidder.
- Other wage-related issues include wage rigidities that can lead to surpluses in some areas, and shortages in other areas.
- The role of the latest EI reforms (making it more difficult for seasonal workers to receive benefits) was also discussed as a deterrent to new people entering the industry.

### Consequences of Labour Shortages

The consequences of labour shortages discussed in the paper include:

- delays (bottlenecks in the production process that occur when key trades are in short supply);
- possible quality problems (as crews are moved from site to site, working long hours at a fast pace);
- impacts on affordability as demand exceeds supply for key housing services; and
- reduced output in the industry as a whole (directly if production ceases, or is postponed, and indirectly if higher costs reduce demand).



The paper briefly discusses the issue of “substitution” as a means of alleviating labour shortages (i.e. new technologies, construction practices, etc.). Historically, the residential sector has been slow to innovate. More research is required in this area.

### Managing Labour Supply and Demand

The paper analyzes the latest occupational projection models that have been developed to manage labour supply and demand (i.e. the COPS\* Construction Model, and the DALCOR Model). These tools are limited by their reliance on employer surveys of labour requirements (where response rates are generally low and the information is quickly outdated). Another problem is that the models don’t directly incorporate supply adjustments regarding immigration, mobility, substitution, and so on. The general conclusion is that it is very difficult to capture the elusive labour requirements and supply responses of the residential construction sector through existing models. The information that the models do produce is not sufficiently disaggregated (i.e. it is very difficult to quantify which trades are in short supply and in which markets).

### Policy Implications

#### *Education and Training*

- More flexibility is required in the apprenticeship system. Regulations on ratios of apprenticeships to journeypersons should be relaxed.
- There is a need to relax narrow craft jurisdictional lines to encourage broader based multi-skilling/multi-tasking.
- There is a need for quicker vocational training programs (crash courses) so new recruits can respond to spikes in demand as they occur. The lag times for getting into the trades when demand is rising must be reduced.
- Government support for vocational training should be equivalent to what is provided for university education.

#### *Mobility*

- There is a need to expand initiatives such as the Red Seal Program and the 1994 Agreement on Internal Trade to encourage mutual recognition and mobility.
- Incentives should be provided to encourage labour to migrate to hot markets.

#### *Human Resources Development Strategy*

- A formal “Residential Sector Council” was suggested to develop an appropriate human resources development strategy.
- CHBA is currently pursuing funding from HRDC to develop such a strategy.

The general conclusion was that education, training and mobility initiatives could proceed now, although more research is required to go beyond that.

\* COPS = Canadian Occupational Projections System

## Pénuries de main-d'oeuvre qualifiée dans le secteur de la construction résidentielle

Dans ce document, on examine pourquoi les pénuries de main-d'oeuvre surviennent et persistent, leurs conséquences possibles, les outils disponibles pour gérer l'offre et la demande de main-d'oeuvre, les conséquences stratégiques et les futures exigences en matière de recherche.

### Pourquoi les pénuries de main-d'oeuvre surviennent et persistent

On peut regrouper sous les catégories suivantes les divers facteurs influant sur l'offre de main-d'oeuvre décrits dans le document :

#### *Cycles économiques*

L'industrie a beaucoup de mal à faire coïncider l'offre et la demande de main-d'oeuvre en raison des marchés cycliques. Les fluctuations du marché surviennent rapidement, et lorsque les nouveaux apprentis sont formés et travaillent sur le chantier, les conditions du marché peuvent avoir évolué, ce qui donne lieu à des surplus de main-d'oeuvre et à des mises à pied. Les économies européennes sont raisonnablement prospères. L'immigration n'est plus la source qu'elle était traditionnellement pour le Canada, car les ouvriers restent dans leur pays. L'économie mondiale (particulièrement aux États-Unis) est également très prospère. Le Canada n'est que l'un des nombreux pays qui sont en concurrence pour obtenir de la main-d'oeuvre qualifiée dans le monde.

#### *Questions démographiques*

La main-d'oeuvre spécialisée au Canada vieillit et n'est pas remplacée  
La construction est une industrie à dominance masculine.

#### *Question de formation et d'éducation*

Les préjugés contre l'enseignement professionnel en Amérique du Nord se remarquent d'abord dans le milieu familial et les conseils scolaires et ensuite dans le financement du gouvernement (les subventions qu'accorde le gouvernement aux établissements professionnels ne sont pas comparables à celles dont bénéficient les collèges et les universités)  
Le système d'apprentissage comporte des lacunes. La réglementation sur le rapport entre les apprentis et les compagnons peut entraîner des pénuries. La classification étroite des emplois et la certification professionnelle peuvent entraîner des goulots d'étranglement. Ces questions sont du ressort provincial.

#### *Questions de productivité/de concurrence*

Le secteur de la construction résidentielle est perçu comme le cousin pauvre de l'industrie de la construction. Il se trouve pris entre le secteur des RCI, où les salaires sont plus intéressants, et l'économie souterraine, où le travail est accompli au noir. Dans les marchés en plein essor, le plus offrant obtient la main-d'oeuvre.

Les autres questions connexes aux salaires sont la rigidité des salaires pouvant mener à des surplus dans certains domaines et à des pénuries dans d'autres.

On a également discuté du rôle des dernières réformes en matière d'assurance-emploi (qui empêchent les travailleurs saisonniers de recevoir des indemnités de chômage) à titre d'élément dissuasif pour les nouveaux ouvriers spécialisés de l'industrie.

### Conséquences des pénuries de main-d'oeuvre

Les conséquences des pénuries de main-d'oeuvre discutées dans ce document comprennent notamment :

- les retards (goulets d'étranglement dans le processus de production qui surviennent en cas de pénuries dans les principaux corps de métier);
- des problèmes éventuels de qualité (lorsque les équipes se déplacent d'un chantier à un autre et travaillent de longues heures à un rythme accéléré);
- des répercussions sur l'abordabilité puisque la demande dépasse l'offre pour les principaux services de logement;
- la réduction de la production globale de l'industrie (directement si la production cesse ou est retardée et indirectement si les coûts plus élevés réduisent la demande).

La question de « remplacement des compétences » comme moyen d'atténuer la pénurie de main-d'oeuvre est brièvement abordée (c.-à-d. les nouvelles technologies, les pratiques de construction, etc.). Le secteur de la construction résidentielle a toujours été lent à innover. D'autres recherches s'imposent dans ce domaine.

### Gestion de l'offre et de la demande de main-d'oeuvre

Dans ce document, on analyse les derniers modèles de projections sur les professions, qui ont été mis au point afin de gérer l'offre et la demande de main-d'oeuvre (p.ex. le modèle de la construction du SPPC et le modèle DALCOR). Ces outils sont limités du fait qu'ils s'appuient sur les sondages réalisés auprès des employeurs, au sujet des besoins de main-d'oeuvre (où les taux de réponse sont généralement faibles et l'information rapidement périmée). Un autre problème est lié au fait que les modèles n'intègrent pas directement les ajustements de l'offre, comme l'immigration, la mobilité, le remplacement des compétences et ainsi de suite. En conclusion, il est très difficile de saisir, au moyen des modèles existants, les exigences précises de la main-d'oeuvre et les réactions de l'offre du secteur de la construction résidentielle. L'information que produisent les modèles n'est pas suffisamment dissociée (c.-à-d. qu'il est très difficile de quantifier les corps de métier où il y a pénurie et dans quels marchés).

## Conséquences stratégiques

### *Éducation et formation*

Le système d'apprentissage doit être plus souple. Il faudrait relaxer la réglementation sur le rapport entre les apprentis et les compagnons.

On doit élargir les frontières étroites entre les métiers afin d'encourager une plus grande polyvalence pour permettre un fonctionnement multitâche.

Il faut des programmes de formation professionnelle plus rapides (des cours intensifs) afin que les nouvelles recrues puissent réagir aux brusques variations de la demande. On doit réduire le temps de réponse pour intégrer un corps de métier lorsque la demande augmente.

Le gouvernement doit accorder à la formation professionnelle le même soutien qu'à l'éducation supérieure

### *Mobilité*

Il faut élargir les initiatives telles que le Programme du sceau rouge interprovincial et l'entente de 1994 sur le commerce international, afin d'encourager la reconnaissance mutuelle et la mobilité.

Il faudrait encourager la main-d'oeuvre à se déplacer vers les marchés à haute activité, au moyen d'incitatifs.

### *Stratégie de perfectionnement des ressources humaines*

On a suggéré qu'un Conseil officiel du secteur de la construction résidentielle élabore une stratégie appropriée de perfectionnement des ressources humaines.

L'ACCH cherche actuellement à obtenir du financement auprès de DRHC afin d'élaborer une telle stratégie.

En conclusion, on indique que l'on pourrait entreprendre actuellement des projets d'éducation, de formation et de mobilité, même si davantage de recherches s'imposent pour ne pas en rester là.



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# **SKILL SHORTAGES IN THE RESIDENTIAL CONSTRUCTION INDUSTRY**

## **1. INTRODUCTION**

Skill shortages are a key issue in the residential construction industry, especially with respect to the trades occupations and site managers. This is evident in a wide range of briefs and reports from the industry itself<sup>1</sup>. Such skill shortages can create bottlenecks that have implications for various dimensions including project costs, quality, productivity, time to completion, and the hiring of other complementary workers. Such effects on the industry, in turn, can have broader impacts on the economy as a whole, given the importance of residential construction to the economy and for the provision and maintenance of adequate shelter.

A variety of questions arise over this issue of practical and policy importance [the section of the report that deals with these questions indicated in parenthesis]. As well, in the concluding section the questions are revisited, with answers provided, as they emerged from the report.

- Are such shortages simply a natural feature associated with the unusual characteristics of this industry? [Part 2, Section on Implications of Related Pressures]
- Are they temporary, reflecting unusual characteristics at particular times and places, or are they likely to be a more permanent, structural feature of this industry? [Part 2, Section on Implications of Related Pressures]
- Why do such shortages arise, and more importantly, why do they persist? [Part 3]
- What are the consequences of shortages for costs, quality, delivery time and the employment of related workers in the industry, as well as for the economy as a whole? [Part 5]
- What information can be gleaned from other areas where shortages have been a key issue such as with nurses, doctors, tool- and-die makers and information technologists? [Part 6]
- What different types of labour market models can shed light on this issue, especially in terms of explaining labour supply and demand in this sector? [Part 7]
- What is the appropriate policy response from the various stakeholders – employers and their associations; employees and their unions if present; and governments? [Part 8, Section on Implications for Stakeholders]
- What information and databases are required to monitor construction labour supply and demand, with a view towards predicting, and more importantly, alleviating and adjusting to

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<sup>1</sup> The Canadian Home Builders' Association, (CHBA, 2000a, p. 2) states: "In recent years, we have experienced a large and growing shortage of workers with the specific skills needed for residential construction. The shortages of skilled workers is now reaching a critical point. It is placing significant constraints on the economic performance of the industry." More ominously, they state "As things now stand, we see no solution to the serious human resource problems of our industry." Carpenters Local 27 (1999) provides cites from a wide range of letters from various employers in its industry indicating current and impending shortages. The National Center for Construction Education and Research in the US indicates that 65 percent of their contractors reported shortages in one or more crafts (Rural Builder, May 1998, p. 26).



future shortages? [Part 8, Section on Forecasting Demand and Supply and Labour Shortages]

As is appropriate given the multidisciplinary nature of the problem, the report draws on a variety of disciplines including:

- *Labour economics* with its emphasis on how shortages can arise and persist in labour markets
- *Macroeconomics* with its emphasis on macroeconomic-forecasting models that provide input into determining labour shortages and that could be used to predict the impact of shortages
- *Industrial relations* with its emphasis on unions and collective bargaining
- *Human resource management* with its emphasis on workplace policies and practices that can impact on shortages
- *Management* with its emphasis on business practices.

The analysis also focuses on a variety of dimensions of labour supply since issues of shortages can be dealt with by adjustments in any or all of these dimensions. These dimensions include:

- Employment, with expanding employment being the conventional dimension that is thought of for reducing shortages
- Hours of work and especially overtime
- Work effort and work intensity
- Outsourcing, subcontracting, and self-employment
- Pre-fabrication, where the labour supply is embedded in the pre-fabricated product.

At times, especially when dealing with the macro forecasting and labour market models, the analysis in this report can be technical. In such circumstances, a non-technical discussion is provided in the text, with the technical material relegated to self-contained appendices or to extended footnotes.

The study begins by outlining the unusual characteristics of the residential construction industry, especially those that have implications for skill shortages. It then places the construction industry in the broader context of the dramatic changes that are occurring in labour markets in general, outlining those implications for labour shortages in construction. The report then provides a discussion of why labour shortages arise and persist. It then links those reasons to the implications for ways in which shortages can be alleviated, both in the short-run and in the long-run. Consequences of such shortages are then analysed, as are lessons from other areas where labour shortages have been an issue, with particular emphasis on whether they shed light on dealing with shortages in construction. Ways of forecasting and managing both labour demand and labour supply to alleviate shortages are then discussed. The report concludes with a summary and a discussion of the policy issues, identifying those that are relevant to specific stakeholders where feasible.

## 2. CHARACTERISTICS OF CONSTRUCTION AND RELATED PRESSURES

The construction industry has unique characteristics that have important implications for labour shortages. It also operates in a broader context of dramatic changes and pressures that are occurring in the labour market in general, as well as at many workplaces. These changes and pressures in turn have important implications for labour shortages in construction and for the ability of that sector to alleviate these shortages.

### Unusual Characteristics of Construction Industry

The construction industry, and especially residential construction, has a variety of unique or at least unusual characteristics, many of which have implications for labour shortages and the ability of the industry to alleviate these shortages<sup>2</sup>. These characteristics include:

- Boom and bust cycles with residential construction being sensitive to cyclical fluctuations. This is in part due to the ease of consumers postponing purchases like new housing and renovations during “bust” times (like the early 1990s) which are then brought on stream in “boom” times (like the late 1990s). In residential construction, however, this is offset somewhat by the fact that consumers who postpone or decide not to purchase a new home may renovate or repair their existing structure. As such, residential construction has generally risen steadily over the 1980s and 1990s.
- When the economy is booming new housing and renovations also increase making it difficult to recruit from other sectors that are also expanding. The “bust” aspect can also make it difficult to recruit into that sector in general, given the associated uncertainty of employment stability<sup>3</sup>
- Seasonal patterns,<sup>4</sup> especially in Canada, and while the seasons are obviously predictable, the weather patterns are not, again increasing uncertainty about employment stability in that sector
- Mega-projects in non-residential construction that can have spillover effects to residential construction by drying up large pools of otherwise available labour

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<sup>2</sup> Discussions of the unique characteristics of the construction industry are given in CHBA (2000a), Dunlop (1961), Economic Council of Canada (1973), Foster and Strauss (1972), Hebert (1977), Jenness (1975), Mills (1972), O’Grady (1997) and Rose (1977, 1979, 1980, 1982, 1987).

<sup>3</sup> The Economic Council of Canada (1973), for example, documented that the employment insecurity for employees was four times higher in construction than in manufacturing. See also Jenness (1975).

<sup>4</sup> The seasonal patterns involve a slight peak in the summer, with most of the seasonal pattern occurring because of a large drop in new home building (and a smaller drop in renovation and repair) over the winter. The seasonal fluctuations also seem to be declining over time. These patterns are documented in the Saskatchewan and the Nova Scotia Human Resource Studies (PRAXIS 2000).

- The industry is bifurcated especially along the lines of residential and non-residential construction<sup>5</sup>, with non-residential construction (the largest component) usually having the high-wage jobs that can draw on residential construction when there are shortages<sup>6</sup>, but with residential construction not being able to draw on the non-residential construction sector in times of labour shortages; that is, residential construction is the “weak cousin” of the construction sector
- Further bifurcation within residential construction between new homebuilding and renovation and repair (the later being largely non-unionised)
- Further bifurcation along regional lines, especially with Quebec where new homebuilding is heavily unionised and regulated with all trades being licensed
- While there is this bifurcation, it is also the case that many workers in residential construction work in both the formal and underground economy, and many alternate between commercial construction (unionised), formal residential construction (union and non-union) and the underground economy. For some trades and regions, 15% to 30% of the workforce may work in both commercial and residential construction over the course of a year<sup>7</sup>.
- Small and temporary worksites in residential construction, with most employers (builders) being small businesses<sup>8</sup> increasingly relying on self-employed independent contractors<sup>9</sup>
- A wide range of links in the “employment” relationship with the employee often being far removed from the builder because of intermediate links with contractors and subcontractors
- In part because of this weak link, builders (who tend not to have extensive personnel and management skills) tend to think of labour as a cost to be minimised rather than a resource to be strategically utilised as a source of competitive advantage
- A substantial amount of “underground” employment in the residential construction sector especially since the introduction of the GST and on-going increases in self-employment<sup>10</sup>,

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<sup>5</sup> This has led the CHBA (2000a, p. 4) to indicate that “current data and data sources are not adequate because they cannot be used to distinguish between residential and non-residential work.”

<sup>6</sup> As indicated in the Residential Construction Labour Market Study “The cyclical nature (boom/bust) and seasonal (winter slow down) and the uncertainty associated with residential construction are some of the reasons why qualified people will stay with the ICI sector until it eventually slows down.” (CHBA, 2000a, Appendix C15, p. v).

<sup>7</sup> Information provided by Bill Empey of Prism Economics and Analysis.

<sup>8</sup> In 1995, for example, 71% of all firms involved in residential home building had fewer than five employees (CMHC, 1997b, p. 1).

<sup>9</sup> Even the larger contractors increasingly go to labour brokers to fill shortages, with the brokers in turn going to self-employed independent contractors.

<sup>10</sup> O’Grady and Lampert (1998) estimate that approximately 28% of total employment in the construction industry in Ontario was “underground employment” between the years 1995 to 1997. That rate was 39% in the residential sector, ranging from a low of 17% in new housing to 56% in renovations and 67% in repair. The CHBA (2000a, p. 2) cites the Ontario Contractors Association estimate of 58,000 to 79,000 underground jobs in new home building and renovation in Ontario from 1995 to 1997. The Nova Scotia Department of Finance (1997) estimates that the

with the underground employment often drawing off skilled workers that could otherwise work in the formal economy

- Fierce competition with low profit margins and a high rate of bankruptcy with the associated uncertainty that this creates and the difficulty of establishing long-term relationships between employee and employer
- Employee identification with their craft or trade more than with their employer
- An industry that is labour intensive, especially in the renovation and repair components
- Requirements for employees in residential construction to have not only trade skills, but also people skills since they often deal directly with the customers who are increasingly sophisticated in their demands<sup>11</sup>
- Increased competition from the “do-it-yourself” economy, with consumers often doing their own work, aided by large retailing centres like Home Depot, as well as TV repair shows<sup>12</sup>
- An industry that is subject to extensive regulations<sup>13</sup> in a variety of areas (permits, licensing, health and safety, workers’ compensation, labour standards, product liability and employer-employee relationships with independent operators with its associated tax implications<sup>14</sup>)
- An incredible array of work arrangements including hourly pay, piece rates, subcontracting, and moonlighting, as well as formal and informal arrangements.

Clearly, the construction industry, and especially residential construction, has unique characteristics that set it apart from other industries. As discussed subsequently in this report,

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underground economy could account for almost half of the value added of the home building sector in that province.

<sup>11</sup> As indicated by the CHBA (2000a, p. 2): “In addition to the mandatory technical skills, workers in new home building and residential renovation need the employability skills to deal with clients and customers. In residential renovation, workers serve customers who are living in the workplace. Given the preponderance of small firms, large numbers of subcontractors also must have a solid grounding in business and administration to manage their contracts.”

<sup>12</sup> As stated in the Construction and Maintenance Electrical Trade Labour Market Study (CHBA 2000, Appendix C10, p. iv): “more and more consumers are finding that they can perform certain kinds of installations on their own. Global marketing, with the aid of catalogues, mail, telephone, internet, and credit card have fuelled a drive to develop products which are user-installable... In support of this trend is the rapid proliferation of television programs aimed at the do-it-yourselfer.” The Expert Panel on Skills (2000, p. 2) finds no generalized shortage of technical skills in the five knowledge intensive industries they examined, but they did find “a persistent shortfall of people who combined strong *technical* skills with *essential skills* (e.g., communication and teamwork) and *managerial* skills (e.g., cost control and budgeting).

<sup>13</sup> Lampert and Denhez (1997) discuss and document the taxes and other regulatory costs outside of the employment relationship.

<sup>14</sup> Revenue Canada is increasingly scrutinizing the relationship of contractors to self-employed independent operators because if the independent operators are used on a regular basis by the same contractor they can be deemed to be employees requiring the payment of payroll taxes and subject to other regulations related to employees. The uncertainty of the requirements in this area adds to the general uncertainty that employers face in this industry.

these characteristics have important implications for labour shortages and for policies aimed at alleviating them.

### Related Changes and Pressures

The construction industry operates in the broader context of a wide range of changes and pressures that dramatically affect labour markets in general, but especially the construction sector. These pressures emanate from the supply side of the labour market, the demand side, and from the institutions and laws that govern the employment relationship.

Pressures from the *supply side of the labour market* include:

- An ageing workforce, with the baby-boom bulge in the population (those born in the late 1940s and early 1950s) now in their 50s – an age when they are often contemplating retirement and how to phase into, and perhaps out of, retirement
- Increased labour force participation of women, including women with young children, many of whom are entering “non-traditional” jobs conventionally done by men
- Related to the increased labour force participation of women, an increase in the number of two-earner families, with such families now being the norm and not the exception
- Increased diversity in the workforce, especially with respect to such factors as ethnicity and visible minority status
- An increased tendency for youths (and other groups) to work part-time, often while in school, and increased concerns with their ability to make the school-to-work transition in times of high youth unemployment
- A shift in the country of origin of immigrants, away from industrial countries mainly in Europe (a traditional source of construction labour), and towards developing countries, especially in Asia, as well as increased emphasis on refugees and family reunification in immigration policy. More recent groups of immigrants have also had a more difficult time assimilating into the Canadian labour market<sup>15</sup>.
- Booming economies in Western European countries such as Italy, Ireland, England and Portugal, which have been traditional sources of skilled immigrant labour because of the earlier “push factors” when their economies were stagnant, are now providing sufficient skilled jobs at home (and in fact are suffering from similar shortages)
- A shift in immigration policy away from trying to meet specific shortages and vocational needs, and towards more general human capital requirements that are believed more suitable to meet longer run labour market needs for flexibility and adaptability
- Increased land and housing prices in the areas of construction boom, making it increasingly difficult for construction workers and suppliers to locate their businesses or own homes in those areas.

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<sup>15</sup> For a discussion of these issues and references to additional literature, see Bloom, Grenier and Gunderson (1995).

Pressures from the *demand side of the labour market* include:

- Increased international competition, in areas where goods and services are traded, associated with globalisation and trade liberalisation
- Dramatic technological change, especially associated with computerisation and a shift to the information economy
- Industrial restructuring mainly from manufacturing to services, both at the “high end” (business and professional services) and at the “low-end” (personal services)
- Increased emphasis on reduced inventories and just-in-time delivery systems, giving rise to needs for a “just-in-time” workforce that is flexible and adaptable
- Public sector restructuring and pressure to “reinvent government,” largely in response to pressures for expenditure reductions to curb deficits and to avoid politically unpopular tax increases
- The legacy of severe recessions in the early part of the 1980s and 1990s, but fairly sustained growth since then.

Pressures on the *institutions and laws* that govern and regulate the employment relationship include:

- Pressures on governments to reduce the degree of regulation in their labour markets, especially regulations that can increase labour costs relative to other countries or jurisdictions that do not have such high labour costs or costly regulations. Capital is now more mobile and companies are now more able to locate their plants and investments in countries or jurisdictions that do not impose excessive regulatory costs. In such circumstances, governments are under more pressure to compete for such investment and the associated jobs by appearing to be more “open for business” by reducing their regulations.
- In part because of this threat of capital mobility and plant relocations, unions throughout the world are more on the defensive with the degree of unionisation in some countries like the United States and the United Kingdom plummeting<sup>16</sup>. In Canada, unionisation rates have been fairly stable since the mid-1960s, and are now at about 30% of the non-agricultural paid workforce. However, union density in the private sector is only about 18% while it is 70% in the public sector<sup>17</sup>. Union density in the overall construction sector (residential and non-residential) is around 30% -- almost exactly equal to the average of all industries, but almost twice the rate of the private sector average<sup>18</sup>. The residential construction sector, however, is predominantly non-union.
- Pressures on governments to decentralise and to devolve many of their functions downwards

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<sup>16</sup> Details on the international picture are given in Mummé (2000).

<sup>17</sup> Details on unionization rates in Canada, including in construction, are given in Akyeampong (2000) and Murray (2000).

<sup>18</sup> As indicated by O’Grady (1997, p. 1): “Outside of Quebec, the union share of the construction industry labour force ranges from 25-30%. Outside of Quebec and the Toronto area, the residential sector is predominantly non-union ... Most measures of union density point to a decline in the union share of construction over the 1980s.”

to lower levels of government. This has occurred especially in the training area, with the federal government “getting out of the apprenticeship and training delivery business” and shifting the function to the provinces<sup>19</sup>.

- A shift in government emphasis in its labour adjustment policies away from “passive” income maintenance programs (like the former unemployment insurance program<sup>20</sup>) towards “active” adjustment assistance (like training, mobility and labour market information policies) designed to facilitate the allocation of labour from declining to expanding sectors and regions. Whether this has been more rhetoric than reality is an open question, given the restrictions placed on governments as previously discussed.
- An emphasis in government programs on “Pan Canadianism” to facilitate the development of a more nationally flexible labour market so as to enhance labour market efficiency within the country, as a precondition to be more competitive internationally.

### Implications of Related Pressures for Construction Labour Market

These various pressures from the demand and supply side of the market as well as from the institutions and laws that govern the employment relationship have both: (1) contributed to labour shortages in construction, and (2) made it more difficult to alleviate those shortages. This suggests a growing long-run problem in the industry, superimposed upon any issues of short-run, temporary shortages. That is, while some shortages may be short-run and temporary, the industry has structural characteristics that are giving rise to more long-run shortages and that are making it difficult to use conventional mechanisms to alleviate shortages. These are illustrated

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<sup>19</sup> Provinces are responsible for education and, as of June 1, 1999, the federal government withdrew from training as well. As such, the current role of the federal government is primarily to bring stakeholders (business, labour, provinces) together – mainly through the Sector Councils – and to assist them in identifying training needs, share best practices, and develop consistent approaches across provinces.

<sup>20</sup> The recent reforms under Employment Insurance have tried to shift the emphasis towards more active components such as: Targeted Wage Subsidies (provide employers with subsidies for specific periods of time to hire people at risk of long-term unemployment); Targeted Earnings Supplements (provide people currently on EI or the long-term unemployed with a wage top-up for a specific period of time); Self-Employment Initiatives (provide financial assistance and business planning advice, helping unemployed people create their own jobs); Job Creation Partnerships (projects to provide unemployed individuals with work experience and employment opportunities to address the needs of a specific regions); Skills Development (loans and grants to individuals to assist with expenses while they upgrade their skills to re-enter the labour market). These measures are client-driven and can be partially tailored to the needs of the individual and/or employer. They could be used by construction employers to draw unemployed persons into the labour market, and by unemployed persons to receive training and upgrading to enter construction occupations. While these programs are available to employers and employees in construction, it is not likely that the small businesses in construction are fully aware of them. Increasing this awareness and access, however, merits more attention.

below, based upon the changing supply, demand and institutional factors discussed previously.

- Residential construction is *sandwiched between non-residential construction and the growing underground economy*, both of which often provide more attractive employment opportunities, thereby contributing to shortages in residential construction and exacerbating shortages by luring employees during expansions
- The *ageing workforce* can also pose a severe constraint on reducing labour shortages, especially amongst the skilled workers who tend to be older<sup>21</sup>. As stated by Scott Macivor, CEO of the Ontario Construction Secretariat, “If we don’t bring in enough new blood, it will be like a species of animal becoming extinct.” (Toronto Star, March 27, 2000, p. A8). Older workers are often contemplating early retirement, and perhaps trying to reduce their worktime to phase into retirement. They are certainly less likely to be candidates for increasing their labour supply to alleviate shortages by working longer hours or increasing the intensity of their work effort. As well, older workers may find it more difficult to adapt to technological change and are generally “more reluctant to participate in training programs, particularly those required to employ new technologies.” (Carpenters’ Local 27, 1999, p. 27).
- The *male-dominated* nature of the industry means that it is less able to use a conventional source of alternative labour supply – females drawn in from the household – to fill shortages.
- The *dominance of the two-earner family* means that it can be difficult to get the workforce to work longer hours since many may have family commitments. The additional income from the other family member working also means that family members can afford not to work overtime or long hours. In essence, each member is under pressure not to work overtime and long hours, and both can often afford not to do so.
- The increased *diversity in the workforce* can also make it difficult (and potentially hazardous) to deal with shortages if, for example, language and communication barriers make it more difficult to add more workers to a site that otherwise has a set of common language and communication skills.
- The *increasing proportion of youths doing part-time work*, including while in school, has proven to be a viable source of flexible labour supply to fill labour needs in other sectors like services and retail trade, especially when evening and weekend work is compatible with school schedules. However, this is not as viable for residential construction (except perhaps for student painters), and especially for the skilled trades, which cannot be filled by casual youth labour.
- The *shift in the country of origin of immigrants* away from traditional sources of construction

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<sup>21</sup> The average age of a bricklayer in Ontario, for example, is 56 year (Toronto Star, March 27, 2000, p. A8). Local 183 of the Labourers’ International Union of North America estimates that 43 percent of its members are over 45. Carpenters’ Local 27 (1999, p. i) estimates that about 60% of its membership is 40 and over, and 20% is 60 and over. For operating engineers, “between 35 and 40% of those involved with construction will retire over the next five years.” (DALCOR, Warrian and MacLeod, 1997, p. 6). Ken Georgetti, head of the Canadian Labour Congress states: “The average age of journeymen in Canada is over 48 years old. That means that in the next seven to 10 years, there’s going to be a 100-per-cent turnover in those skilled workers.” (Ottawa Citizen, August 19, p. D1).



labour, and the enhanced emphasis on refugees and family reunification means that immigration may not be as important a potential source of labour supply to alleviate skill shortages<sup>22</sup>.

- The *booming economies of Western Europe* have also reduced the traditional sources of skilled labour emanating from the earlier “push factors” when workers could not find jobs in their own economy.
- The *shift in immigration policy* away from trying to meet specific shortages, and towards more general human capital requirements, may also make it more difficult to meet construction shortages through immigration
- The *increased land and housing prices* in the booming construction areas are making it increasingly difficult for construction labour and material suppliers to locate near the construction worksites.
- The *non-tradable* nature of the final product of residential construction – a building or a renovation or repair -- means that imports of products or services generally cannot be used to alleviate domestic shortages. For example, if there is a shortage of new homes, foreign-built new homes cannot be directly imported, nor could foreign-made renovations. This is in contrast, for example, to a shortage of domestically-made computers, where foreign-made ones can easily be imported<sup>23</sup>.
- While *technological change and the information economy* provide the potential to alleviate labour shortages in the long run, this is very difficult to infuse into the small, cash-strapped businesses of residential construction. Furthermore, these can create their own shortages of persons who can work with the new technology – a particular problem given the ageing construction workforce and the dearth of new young entrants and training opportunities.
- While *prefabrication* provides the potential to alleviate shortages, it also gives rise to a potential shortage of persons to install and maintain the prefabricated product<sup>24</sup>
- The increased emphasis on *reduced inventories and just-in-time delivery* of material suppliers can create material shortages in residential construction that can worsen labour supply issues, especially given the difficulty for small contractors to co-ordinate the skills and materials inputs
- The *severe recession of the early 1990s* led to reduced construction, reducing the skill base<sup>25</sup> and creating a pent-up demand, both of which worsened shortages in the late 1990s.

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<sup>22</sup> As stated by Carpenters’ Local 27 (1999, p. 8): “Historically, the immigrant flow has contained a substantial number of persons either certified in the construction trades or willing to seek such certification in Canada. This is not the case any longer.”

<sup>23</sup> Of course, *inputs* into residential construction can be imported, and as discussed, this could occur in such forms as pre-fabricated assemblies, as well as through “imported” workers via temporary work permits.

<sup>24</sup> Corian products, for example, are rapidly replacing wood (and the associated carpenter skills) in a variety of areas, but the product manufacturers are safeguarding their product by requiring only certified installers. Similar issues are arising with electronic hardware and pre-engineered homes (Carpenters’ Local 27, 1999, p. 12,13).

<sup>25</sup> As stated by the Carpenters’ Local 27 (1999, p. 2): “The economic downturn of the 1990s eroded the construction industries employment base.”

- Recent *changes to the EI system*<sup>26</sup> have inadvertently discouraged new recruits to the construction industry and have made it more difficult to retain existing workers.

These various background pressures and changes suggest that there are structural, longer-term forces at work that are exacerbating the tendency for labour shortages in construction. These trend factors are over and above the shorter-run, cyclical factors that are associated with the recent economic boom. In essence, when these short-run or temporary demand changes occurs, there are structural factors that make it increasingly difficult for the construction sector to respond to alleviate those shortages.

In summary, the residential construction sector is sandwiched between non-residential construction and the growing underground economy, both of which are exacerbating shortages in residential construction. Residential construction has an ageing workforce that is entering the conventional age of retirement, and that is in peril of not being renewed because of the lack of information that youths have about the field and because of difficulties in the training and apprenticeship system. Construction is less able than other industries to draw on sources such as imports or women from outside the labour force or youths in school. It faces increasing resistance against overtime and long-hours from an ageing workforce many of whom are in two-earner families also facing a “time crunch” in their home. As well, it is less able to rely on a traditional source of labour supply for the industry – immigration – because of the shift away from source countries that have historically provided skilled construction labour, the greater ethnic diversity which can give rise to communication barriers and the shift in immigration policy away from filling specific shortages. These longer-run structural trends are likely to continue into the future, and some, like the ageing workforce, are likely to increase dramatically. This highlights that the underlying forces are such that the problem of shortages in construction are not just temporary, and are likely to increase in the future. Structural problems require structural solutions.

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<sup>26</sup> O’Grady (1997, p. 2) provides evidence from Human Resource Development Canada indicating that the recent EI reforms will reduce benefits to the construction industry by 14% across the country, ranging from 11% in Ontario and the Prairie Provinces to 16% in Quebec. He further indicates “The principle effect of these changes to the unemployment insurance system will be to discourage workers with a casual or marginal attachment to the construction labour force from remaining in the construction industry... The size of this pool of marginal workers is approximately 20% of the construction industry labour force, although some estimates place that share at 30%.” DALCOR, Warrian and McLeod (1997, p. 10) state: “Changes in the UI system have eliminated much of the funding previously used to support training. For example, raising the minimum number of hours makes it harder for workers to qualify for EI support. Since construction was a prime beneficiary of such funding, the change is making careers in the construction industry less desirable than work in industries with more stable employment.” Clearly, the recent reform of EI can increase labour shortages in construction. The self-employed are also not eligible for EI and since this is a growing component of the construction workforce, this means that the construction workforce is increasingly ineligible for EI.

### 3. WHY DO LABOUR SHORTAGES ARISE AND PERSIST?

Labour shortages can arise and persist for a wide range of reasons. This section deals with the theoretical reasons as to why labour shortages can arise and persist. It is based on the insights provided by different disciplines such as labour economics, macro modelling, industrial relations, and human resource management. The discussion will be generic, with the concepts being relevant to any industry<sup>27</sup>. It will then be applied to the construction industry to see which if any of the arguments are applicable to the unusual characteristics of that industry. The relevant literature will be cited with respect to the different arguments.

Understanding the source or underlying cause of the shortages is important for two main reasons:

- to predict impending shortages and when they may dissipate, and
- to develop solutions to the problem.

#### Short-run Demand Changes and Mega-Projects

The most obvious reason for labour shortages is short-run demand changes including those associated with mega-projects. Examples of the latter include pipeline developments, Expo construction and Hibernia offshore oil development. Pressure can also arise from “big ticket” construction items like the expansion of Pearson Airport in Toronto and the possible extension of Highway 407, as well as the possible summer Olympics in 2008. In many cases, these projects are known well in advance, which facilitates anticipating potential labour shortages and setting procedures in place to minimise their occurrence or consequences. In other cases, the shortages are unanticipated (e.g., oil crises that lead to pipeline and other construction booms). In these circumstances, it is more difficult to proactively establish procedures to deal with the shortages

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<sup>27</sup> For many industries (e.g., energy, transportation and communication) peak-load demand models are used to explain shortages of services. In those industries, demand changes are often subject to peaks such as telephone demands during the business day and holidays, or electricity demands that peak at the end of the day or during the heating and cooling season, or transportation demands that peak during rush hours or holidays. The peaks are often, but not always, predictable. In these circumstances, the shortages often reflect the short-run failure or inability to raise prices to ration demand during the peak, and the long-run failure or inability to expand capacity (peak-load pricing and capacity expansion being key decision variables in those frameworks). In the discussion of residential construction that follows, parallels will be apparent since similar issues arise over barriers that make it difficult to follow peak-load “pricing” with respect to wages in the short-run (e.g., rigidities in wage structures, monopsony) or to expanding labour capacity in the longer-run (e.g., through training, broader job classifications and immigration).

or their consequences. Short-run demand changes could also be more generic, emanating from general business cycle expansion and periods of prosperity that lead to construction demand, especially in housing.

Mega-projects, of course, are in non-residential construction, but their impact on shortages can filter down to the residential housing market. This is especially the case since compensation tends to be better in non-residential construction and hence it can draw on the pool of workers in residential construction.

Demand changes associated with business cycle expansions are more likely to impact residential construction with such construction increasing in periods of prosperity. This is especially true since economic slumps (like in the early 1990s) can lead to postponed spending in construction (both residential and non-residential), with that pent-up demand coming on stream when prosperity returns (as in the late 1990s). While business cycles may be more subject to policy control now than they were in the past, there is still tremendous uncertainty about their timing and severity. In the case of the construction industry, this is augmented by the fact that there is uncertainty about how governments may respond to cyclical changes. If, for example, government follows a tight monetary policy that raises interest rates and hence mortgage rates, this may dampen residential construction.

Certainly some of the current housing boom and labour shortage in residential construction reflect pent-up demand from purchases that were postponed during the recession of the early 1990s. As well, some of the current boom reflects unanticipated increased housing demand in expanding communities like Ottawa, Toronto and Edmonton. While we are all great investors “after-the-fact” and we understand afterwards why the expansion occurred, it is not so easy to predict such areas of expansion *ex ante* or “before-the-fact.” It is easy to see now how the high-tech boom in the Ottawa area led to construction expansion there, but it would have been reasonable to have earlier predicted a declining housing market associated with the fall in civil service employment in that area.

Adjusting proactively in advance to be better prepared to deal with impending shortages if unanticipated demand increases occur in the future, is made more difficult by the fact that unanticipated demand declines can also occur, in which case contractors could be left with extreme surpluses. It may have been easy to predict some of the housing boom in Vancouver as there was an exodus of people from Hong Kong when it reverted back to mainland China (that date being known in advance), but few predicted the subsequent general economic crises in Asia that had negative spillover effects on housing demand in places like Vancouver.

Political changes can also affect the market for new housing, especially when they have an impact on the general business climate. The threat of Quebec separation had earlier led to an exodus of anglophones – often-wealthier business people – to Toronto, and this “heated” the Toronto housing market. Such political uncertainty, and the associated response of potential homeowners, is difficult to predict, leading to further uncertainty in the housing market.

### Seasonal and Weather Related Factors

Seasonal changes can have an impact on residential construction, albeit the effects are generally not substantial. Furthermore, the seasons are predictable and hence it is generally possible to smooth out some construction across seasons, especially by postponing work that can be left to the “slow season” and by “making hay when the sun shines.” This is evidenced by the fact that there are not substantial changes in construction activity between the Spring, Summer and Autumn. The main change is a drop in new home building in the Winter.

Weather changes, however, are not so predictable and can thus have severe impacts on residential construction. Domino effects can be set in motion given the sequencing that is often required. Not being able to dig a basement or put on a roof because of rain can make it difficult, if not impossible, to do subsequent jobs. The problem is compounded by the fact that small contractors cannot always have a “portfolio” of different jobs such that if one job is postponed by rain, it is possible to shift crews to another site that can operate under the rain.

### Cobweb Models Incorporating Uncertainty, Time Lags and Adjustments<sup>28</sup>

If labour demand changes could be predicted with certainty and there were no time lags or costs in the adjustment process, then labour supply responses would be immediate and shortages would not occur. But, of course, uncertainty, time lags and adjustment costs are ever present in labour markets, and especially for construction labour.

As discussed previously, there is tremendous uncertainty over demand changes in the construction industry. There is also uncertainty, however, over how other elements of labour supply will respond, including secondary workforces and workers doing piecework, as is increasingly common in residential construction. Construction workers contemplating a move to another region because of labour shortages may well be concerned that many others may also move to that region leading to a dissipation of the shortage and even a surplus by the time they arrive. The same uncertainty applies if workers contemplate entering a training program that may take a long period of time to complete, as is the case with apprenticeships.

Time lags can be present in almost all phases involved in the build up of shortages and in policies to alleviate them. There can be lags in forecasting the shortages with the shortages occurring before the forecast is out. Longer lags are likely to be involved in the policies designed to alleviate the shortages. This is obviously the case with training and apprenticeship programs, in geographic moves, and in “turning the immigration tap on” in specific areas of shortage. Thus, by the time the labour supply has responded to the shortage, the shortage may have disappeared and even turned into a surplus.

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<sup>28</sup> These are emphasized, for example, in Freeman (1975, 1980), Arrow and Capron (1959).

Adjustment costs are also involved in each of those stages. Training and apprenticeship programs can be costly especially in terms of the income forgone while in the training program. Geographic moves are costly, especially if they involve family moves or being separated from family. Even the acquisition of information about shortages and job opportunities can be costly.

In such circumstances, cobweb adjustment cycles can occur. The scenario works as follows. An unanticipated demand increase occurs. This gives rise to temporary labour shortages that increase wages<sup>29</sup> and job opportunities. Workers respond to those opportunities by moving to them or by taking the training necessary to do the work. Such moves or training, however, take time because of their costs. By the time workers have completed the move or the training, the demand increase may have dissipated to the point where there is perhaps an oversupply of persons in those trades. Even if the demand is sustained there may be an oversupply of workers because people did not anticipate so many others responding in the same fashion. This leads to wage reductions and unemployment. This in turn leads to a reduction in labour supply as people leave those areas and do not engage in training in those skills. A cobweb model of wage increases, overadjustments, wage decreases etc. can be put in motion with all of the uncertainty and adjustment costs that are entailed.

Even if the demand increases can be predicted with certainty, it is extremely difficult to predict how others will respond to the shortages. This is especially the case because, as discussed previously, labour supply adjustments can occur in the hours and intensity of work dimension, as well as the conventional employment dimension. By the time one finds out how others have responded it may be too late, especially when costly geographic moves or training and retraining is involved. This extreme uncertainty can make individuals reluctant to engage in the costly adjustments to respond to the shortages.

### Barriers to Financing Skills Acquisition

The reluctance of workers to adjust in order to take advantage of the shortages may also stem from other “market imperfections”. The acquisition of labour market information, training, and mobility is essentially a decision to invest in human capital – to incur costs now (often in the form of forgone income while engaging in a geographic move or training) in return for benefits later. The benefits to workers would be the higher wages and better job opportunities associated with retraining or moving to the areas of labour shortage.

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<sup>29</sup> Wages are highly responsive to demand changes in residential construction, more so than in non-residential construction. This is so for a variety of reasons. Outside of the GTA and Quebec, residential construction is non-union, and non-union wages tend to be more volatile. Employer-employee relationships tend to be transitory, with every change providing the opportunity for a wage change. Most work in new home building is piecework, which is easy to adjust by claiming special conditions (e.g., distance, weather). Also, much of the work is subcontracted, with subcontracting prices being easy to adjust. (Information provided in communication from John OGrady).

Even if workers were certain of the labour shortage and that there would not be a cobweb overadjustment response, there may still be barriers that would inhibit them undertaking what otherwise appears to be a rational human capital investment decision of investing in the skill acquisition in the area of labour shortage. They may simply not be able to afford the move or the training, and even if it yielded a substantial return to their investment, they may be liquidity constrained and thus not have the money to finance the investment. The normal response to such “profitable” investments is to borrow on the capital markets, and use the subsequent returns to repay the loan. This is the conventional response to other costly investments such as for a business or for capital equipment. But for these purchases the lending institution is willing to lend because the borrower can use the asset or physical capital as collateral for a loan. The lending institution can repossess the asset if the loan is not repaid.

For investments in human capital (unlike physical capital), however, the borrower cannot directly use their human capital as collateral for a loan. Since “debtors prisons” no longer prevail, the lender cannot repossess the human capital (since it is inseparable from the borrower) if there is default on the loan. A guarantee on wages is one possibility, but there is a “moral hazard” problem in that the borrower can influence how much they work subsequently.

In that vein, there is a market imperfection that can inhibit liquidity constrained *workers* from borrowing the necessary funds to engage in what otherwise would be a rational decision to invest in human capital in areas undergoing labour shortages.

*Employers* who are experiencing shortages can have an incentive to invest in the mobility or training to close the shortages, but only if they can guarantee that the worker will stay with them long enough to recoup the investment. This too is very difficult since “indentured service”, like “debtors prisons” is no longer legal! The contractor cannot be guaranteed that the worker will stay, especially in a market where they are now better trained and where there are general labour shortages in their skills<sup>30</sup>. One way to retain the worker is to pay higher wages to avoid having the worker “poached” or “raided” by other contractors. But in these circumstances, the contractor “double pays” by paying for the human capital formation and then by having to pay a wage premium to keep the now more skilled worker. Only if the training is “firm specific” (i.e., usable *only* in the organisation that does the training) will the employer have an incentive to pay for the training or mobility that will reduce the shortage. This is not the case in the construction

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<sup>30</sup> As aptly stated by the Joint Human Resource Development in Residential Renovation Committee of the Canadian Home Builders’ Association “The most important training challenges identified by renovators are the lack of worker interest and commitment to training, and loosing employees to other employers when training is complete.” (CHBAa, 2000, Appendix A4, p. xii). As stated by DALCOR, Warrian and MacLeod (1997, p. 8): “the issue is how to recover costs from those who benefit without supporting the cost.” As stated by Franke and Sobel (1970, p. 296) in their analysis of the construction industry: “The fear that workers would move after completing their training, thus removing any potential gain, deterred many firms, especially smaller ones, from training workers.”

industry, and certainly in residential construction, where the skills are generally usable by a variety of contractors. As well, there is the further lure for skilled workers to go to non-residential construction (with its higher wages) or the underground economy (with its non-taxed features).

In those circumstances, the employee may have the monetary *incentive* to pay for the generally usable training or mobility, but not the *means* to do so, or access to the capital markets to finance otherwise profitable investments in human capital. In essence, such imperfections in the human capital market may inhibit market responses that would normally dissipate the shortages.

### Rigidity in Wage Structures

Since a shortage of labour occurs when the demand for labour exceeds the supply of labour at the going wage rate<sup>31</sup>, the conventional economic solution to shortages is to raise wages. Higher wages can induce an increase in all dimensions of labour supply: increased employment, longer hours and even more work effort and intensity. In the long run, they can encourage more people to enter the trade, to move, to upgrade their skills and even postpone retirement or return from retirement. Higher wages can also induce a decrease in demand for the higher-priced skilled labour that is in short supply, by encouraging employers to substitute other inputs (substitution effect) by using, for example, other workers, prefabricated products or subcontracting to self-employed independent operators. Contractors may also reduce their output (output effect) because of the higher wage costs, thereby employing less of the skill labour in short supply and less of all other inputs. In the extreme some contractors may even go out of business because of the higher wage costs. These are, respectively, the substitution and scale effects that lead to a reduction in the demand for labour whose price has risen. Both the increased labour supply and the reduced labour demand induced by the wage increase should serve to alleviate the labour shortage. This is the market response, where wages are flexible and allowed to “clear” markets. This can occur indirectly through piecework and self-employment, both of which have increased in residential construction.

In that vein, persistent shortages are more difficult to understand than persistent surpluses

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<sup>31</sup> Blank and Stigler (1957) discuss other concepts of labour shortage such as socially determined shortages when the number of personnel available is less than the number needed as determined by a social norm such as pupils per teacher. They and Arrow and Capron (1959) also emphasize dynamic shortages resulting from supply increasing less rapidly than demand based on pay from the recent past. More recent discussions of shortages, and the role of wages in alleviating shortages, are given in Boyer and Montmarquette (2000), the Expert Panel on Skills (2000) and Roy, Hensen and Lavoie (1996). Concepts of shortages based on other factors such as employers perceptions of technical skills and behavioral attitudes are discussed in Bosworth (1993), Bosworth, Dutton and Lewis (1992), Green and Ashton (1992), Green, Machin and Wilkinson (1998), Haskel and Martin (1993a, 1993b) and Oliver and Turton (1982).



of labour. Surpluses can arise when wages are set above the market clearing level so that the supply of labour exceeds the demand at the going wage rate. Wages set above the competitive rate can occur for a myriad of reasons such as union wage premiums, public sector wage premiums, and wage fixing legislation (e.g., minimum wages, equal pay, “fair wage” requirements in government contracts, and wage extension by decree). In such circumstances, employers are constrained to accept those wages and even though they have an incentive to reduce them, they cannot do so. For shortages, however, employers and employees *both* have an incentive to have wages increase. Employers generally have an incentive to raise wages to attract the necessary labour supply, and workers obviously prefer higher wages. Rigidities in the wage structure, however, can inhibit the use of this mechanism.

Collective agreements, for example, can specify rate schedules that lead to surpluses in some groups and shortages in others. The shortages are more likely to occur for the more skilled groups given the fact that unions tend to compress skill differentials<sup>32</sup> (e.g., by negotiating flat dollar amount increases that are a smaller percentage increase at the higher end of the skill distribution.) These may be “negotiated-out” in subsequent bargaining rounds, but this can take considerable time, leading to lags in the adjustment process as discussed previously. The shortage of particular types of skilled nurses, for example, has been attributed in part to the lack of a skill wage premium for particularly onerous jobs such as emergency room work. Some of this lack of skill premium, of course, may be part of the strategy in collective bargaining.

Even in non-union environments, spillover effects may occur from the unionised environment. For example, if shortages arise because of rigid wage structures in unionised non-residential construction, this can have spillover effects leading to shortages in non-unionised residential construction.

Union wage premiums in the unionised sector (e.g., non-residential construction) can also make it more difficult to recruit to fill labour shortages in the lower paying, less unionised sector (e.g., residential construction). This is compounded when the shortages prevail in both unionised and non-unionised labour markets.

The difficulty can be compounded by government regulations requiring the payment of “fair wages” in government contracts, where fair wages are often interpreted as the prevailing wage in the unionised sector. Since government contracts are invariably in the non-residential construction sector, this means that employers in residential construction often have to compete for labour against employers in non-residential construction who are either unionised or required to pay union wages. This can increase the difficulty of filling shortages in residential construction.

Similar situations can arise when cities, municipalities or school boards have binding

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<sup>32</sup> Canadian evidence on this is discussed in Benjamin, Gunderson and Riddell (1998, p. 556-64). The pay compression appears prominent in Quebec where construction is extensively unionized and where wage differentials across the trades are small.

agreements to only utilise union labour. The Toronto School Board, for example, has binding agreements with trade unions covering most of their renovation and maintenance work. The former Metropolitan Toronto Council had agreements with carpenters, plumbers, electricians and bricklayers, while the City of Toronto had these plus agreements with painters, asbestos workers, glaziers and tilers (National Post, November 3, 1998, p. B4). Again, in these circumstances, employers in residential construction have to compete for labour with higher paying union employers in non-residential construction, exacerbating their difficulty of reducing labour shortages.

Rigidities in wage structures can also arise because of wage-setting requirements within the apprenticeship system with respect to such factors as the ratio of wages between apprenticeships and journeymen and masters. They may also arise because of government pay practices to pay uniform rates across different regions, or not to pay competitive market rates to executive-level personnel.

Rigid wage structures may also be fostered by beliefs of construction workers themselves as to what is the appropriate norm or structure. As stated by Dunlop (1961, p. 264): “They [construction workers] tend to believe that all employees in the same rank or classification should receive the same compensation regardless of the branch of the industry.”

In general, it is difficult to determine the extent to which rigidities in wage structures contribute to labour shortages in residential construction. That sector is not extensively constrained by rigidities imposed by collective agreements, nor is it affected by government or institutional pay policies. It is a fairly flexible and fluid labour market. Rigid wage structures are likely to be more prominent in non-residential construction given the greater prominence of unions, apprenticeship regulations, “fair wage” regulations in government contracts, and wage norms. These can create shortages in the non-residential sector, which can spillover to the residential sector to the extent that contractors in the non-residential sector “raid” the residential sector to fill their shortages.

### Monopsony Where Employers Influence the Hiring Wage

While contractors in the residential construction sector are not likely constrained by rigidities in the wage *structure*, they may be constrained by a reluctance to raise wages to attract additional skilled workers because of what that would do to the wages they would have to pay to their existing workers. If contractors raise wages to attract *additional* workers to fill shortages, they will likely have to raise the wages of their incumbent workforce to preserve internal equity (and peace). This will certainly be the case for workers of similar skill levels, but it may even be the case for other workers given that there are historical wage relativities (“orbits of coercive comparison”) that often prevail. Morale and other problems are likely to prevail if two similarly skilled workers at the same work site are paid differently, with the higher wages being paid to the *new* worker simply because that was necessary to attract that person to close a shortage. Telling the incumbent worker “I didn’t have to pay you the higher wage because you are already here” is

likely to be small consolation. The problem is particularly severe because even if incumbent workers are not likely to leave (they may have ties to that particular contractor, or not want to leave the community) they can adjust their effort and commitment so that the contractors “get what they pay for.” This can be particularly severe in residential construction sites where it is difficult to constantly monitor performance and quality.

Thus for the contractor, the cost of closing a labour shortage is not just the higher wage that has to be paid to attract new workers. It is also the additional cost of the higher wages that have to be paid to the existing incumbent workers to maintain internal equity and relativities. For example, if a contractor can fill a single shortage with a new recruit by raising pay by \$5.00 per day more to attract that new recruit, and if the contractor has to pay the higher wage to its existing workforce of five people, the additional cost of filling that *one* shortage is \$25 per day, not simply \$5.00 per day. Under such circumstances, contractors understandably would be reluctant to use the conventional wage mechanism to reduce shortages. The solution of “if you have a shortage, then pay more” is not so simple.

Under these conditions -- termed monopsony by labour economists -- “equilibrium shortages” can exist and persist. Employers will constantly report vacancies or shortages (because demand exceeds supply at the going wage) but they will not raise wages to reduce those shortages because the higher wage (or at least some of it) paid to attract the new employees also has to be paid to the existing incumbent workforce as well. This is simply too costly.

In order to avoid paying the additional wage to the existing incumbent workforce, employers will likely try to use non-wage mechanisms to attract new recruits so as not to have to pay the additional cost to the existing incumbent workforce. Such non-wage recruiting mechanisms include advertising, recruiting campaigns, labour brokers, moving expenses, signing bonuses and extensive search for new employees<sup>33</sup>. Employers will also try to differentiate the new recruits from the incumbent workforce so that higher pay can be given only to new recruits without inviting invidious comparisons from the existing workers. This can be done, for example, by paying for “paper qualifications” that may be possessed by the new recruits and not by the incumbent workers, although this can still engender resentment if it is apparent that such credentials are not relevant to the job.

A more viable mechanism is through the use of temporary help agencies, subcontracting or piecework. Even if they are more expensive, temporary help agencies can provide workers without inviting as many invidious comparisons from incumbents. The same applies to subcontracting, where incumbent workers are not likely to be aware of the price being paid for the subcontract. Piecework is also less likely to involve invidious comparisons from incumbent workers.

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<sup>33</sup> In the information technology sector, for example, employers have sought to reduce shortages by hiring bonuses, retention incentives, and non-wage benefits such as flexible work hours, childcare, eldercare, fitness centres, and car washes (*Computerworld*, March 9, 1998).

Conditions giving rise to monopsony include

- Employers who cannot hire all of the labour they want at the going wage but that have to raise wages to attract additional workers
- Incumbent employees, some of whom are tied to their existing employer perhaps because of loyalty or lack of mobility or ties to their community.

Such conditions would seem to be a distinct possibility in residential construction, although it is difficult to determine the extent to which they prevail. Some evidence of monopsony has been found in the labour markets for nurses, teachers, professors, newspaper printing workers, and importantly for this study, for construction workers.<sup>34</sup>

### Narrow Job Classifications and Single-Skilled Training

Narrow job classifications and single-skilled training can also be barriers in dealing with labour shortages. If a shortage occurs in a specific narrow craft, that shortage could potentially be filled if others could do the job. Obviously, there may be some sacrifice in the quality of the output, but this may be less problematic than having no output if the shortage cannot be filled. The retort “It’s not my job” can be a significant barrier to getting things done, especially in residential construction sites where the specific job may be done infrequently and spread over a longer time period and different sites may be far apart. Workers who are trained only in one single set of tasks may not be able (or willing) to do a wider range of tasks, or an occasional job in other tasks.

This is in contrast to the general trend towards broader-based job classifications and multi-tasking over a wide range of job functions. In the “old world of work” organisations were typically vertically structured with well-defined hierarchies of higher-level and lower-level tasks. In the “new world of work,” however, organisations are more horizontally structured with job incumbents doing a wider range of different tasks. There is also greater emphasis on multi-skilling and broader-based, generic training that provide the foundations for future retraining. “Learning how to learn – and relearn” is increasingly emphasised in a world of life-long learning especially where technology is constantly changing the way in which work is being done.

Narrowly-defined job classifications that can be a barrier to reducing skill shortages can arise for a variety of reasons. They may exist as part of a collective agreement, especially where craft lines are clearly delineated. Further, they may result from apprenticeship rules and regulations as well as occupational licensing and certification requirements (discussed later).

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<sup>34</sup> See Cohen (1972), Hurd (1973), Link and Landon (1975, 1976) and Sullivan (1989) for nurses; Landon and Baird (1971), Dahlby (1981) and Currie (1991) for teachers; Ranson (1993) for professors; Landon (1970) for newspaper printing workers; and Landon and Pierce (1971) for construction workers.

The constraints imposed by narrowly defined job classifications and single-skill training are likely to be more prominent in non-residential construction than in the less formal labour market of residential construction. This is especially the case since unions are less prominent in residential construction, and because it is difficult to monitor and enforce licensing requirements.

#### Licensing, Certification, Preferential Hiring and Union Control

Occupational licensing requirements give the “exclusive right to practice” to those with the occupational licence. Others cannot do that work. This is the case, for example, with doctors and lawyers. In contrast, occupational certification gives only the “exclusive right to title” to those with the certification. Others can do the work, but they cannot use the title. Obviously, occupational licensing is more restrictive since it would not be possible to use others to reduce shortages, although other paraprofessionals can often do some of the tasks – as when midwives can deliver babies.

The construction trades have both licensing and certification, with the phrase *mandatory* usually used in reference to licensing and *voluntary* usually used in reference to certification. Electricians are licensed and only electricians can do a certain set of electrical tasks for pay. Equipment operators are often certified, but others can do those tasks. Licensing and certification are fairly common in craft jobs. For example, almost one-third of the craftworkers in production jobs are licensed or certified. The province of Ontario licences around 30 trades, and has delegated the power to municipalities to license some 60 others (Trebilcock, Kaiser and Prichard 1979, p. 118).

Interprovincial mobility of skilled labour can be inhibited by the lack of uniformity of licensing requirements as well as by the types of trades that are licensed<sup>35</sup>. Qualifications earned in one province are not always recognised in another province<sup>36</sup>. Residency requirements can be imposed, as can differential fees on non-residents. Interprovincial mobility can also be inhibited by less formal restrictions such as red tape in business registration and licensing, and even harassment of workers in sites in other jurisdictions (CCH Labour Notes, January 18, 1999, p.3).

The potential for abuse has been strongly stated by the recent Immigration Legislative

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<sup>35</sup> In the Canadian context, these are discussed, for example, in Brown, Lazar and Schwanen (1992), Gunderson (1994), Milne (1987), Trebilcock, Kaiser and Prichard (1997), and Trebilcock, Whalley, Rogerson and Ness (1983) and Watson (1983).

<sup>36</sup> Provincial governments, in cooperation with the federal government, are working under the Agreement on Internal Trade to ensure that regulatory bodies develop clear processes for reviewing and recognizing occupational credentials across provinces by July 1, 2001. In most instances, this will be achieved through the negotiation of mutual recognition agreements between the regulatory agencies. This occurs, for example, through National Red Seal Exams, administered through the Canadian Council of Directors of Apprenticeships, which currently recognize 44 trades in several jurisdictions, with governments working to expand this number.

Review Advisory Group report *Not Just Numbers: A Canadian Framework for Future Immigration* (1998, p. 36):

“Each province at some stage in its history created bodies that were empowered to regulate access to trades and professions in the province through licensing and registration requirements. These associations have operated in an extremely independent manner, often free of political scrutiny and accountability. Many have used their role as protectors of the health and safety of consumers as a guise to protect the interests of their members through exclusionary entrance requirements. This has made interprovincial mobility for all Canadians extremely difficult, and has created even greater barriers for immigrants, who are viewed as a threat to the earning power of the members of some professional associations, and as unknown quantities with unknown qualifications by other bodies.”

Provinces can also encourage preferential regional hiring practices when they issue permits for projects in such areas as pipelines, mineral exploration, oil and gas exploration and in construction (Milne 1987, p. 4). In the Quebec construction industry, for example, preferential hiring is fostered by the fact that construction workers must meet four criteria: possess a competency card issued by the Quebec Construction Commission; complete a mandatory 30-hour safety course; be a member of one of the five employee associations; and conform to the regional priority rule which stipulates that workers in the region where the project takes place have priority over workers from outside the region.<sup>37</sup>

Unions can also control labour supply to the construction trades. As stated by Rose (1982, p. 400): “through the closed shop (where individuals are required to join the union prior to employment) and the hiring hall (where the union controls referrals of workers to employers) the union strongly influences the entry of workers into the industry.” This is true mainly of non-residential construction, and to a lesser extent in new home building, but it can have spillover effects to other sectors in residential construction.

It is difficult to determine the extent to which occupational licensing requirements, preferential hiring practices or union entry restrictions have been barriers to the use of other workers or to mobility that could otherwise alleviate labour shortages. This is so mainly because while they can be barriers to the effective deployment of workers, they can also alleviate shortages. Licensing, for example, can increase employer confidence that a qualified person will fill the shortage, and the hiring hall can operate as an effective job matching mechanism. Certainly, these factors are likely to be more prominent in the non-residential construction sector than in the less formal labour market of residential construction. But again, this can filter down to the residential construction sector. If the non-residential sector is not able to use substitute labour or labour mobility to reduce their shortages, they may hire from the residential construction sector, thereby creating shortages in that sector.

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<sup>37</sup> Information provided by Professor Jean Boivin of Laval University.

## Rigidities in the Apprenticeship System

The apprenticeship system is obviously a key source of skilled labour in construction, albeit more so in non-residential construction than in residential construction. The two largest apprenticeship trades in Canada, construction electricians and carpenters, are in the construction industry (Sharpe 1999). The system involves a mixture of on-the-job training and off-the-job instruction, often in vocational institutes or special apprenticeship training centres. The on-the-job component is by far the most important, accounting for about 90% of the apprenticeship training. This means that the training is procyclical, in that it ceases in a downturn if the employee is laid off or employers are reluctant to take on new apprentices. Apprenticeship programs are typically run by apprenticeship councils with representation from unions, employers and governments. The union influence typically is very strong.

Some features of the apprenticeship system that may inhibit the alleviation of skill shortages have already been mentioned. Rigid wage structures with respect to the pay of apprentices relative to journeypersons may inhibit the use of wage increases to reduce shortages. The apprenticeship system itself is subject to long time lags between when a shortage is perceived and people enter the program and when they complete it. By then, the shortage may have disappeared. Worse, large numbers of others may have done the same thing, leading to an oversupply (i.e., a cobweb adjustment cycles).

The licensing requirements of the apprenticeship system can foster the narrow craft jurisdictional lines that make it difficult for others to do the work of the skilled craft if there is a shortage of skilled labour. Apprentices themselves may be reluctant to do “lesser” jobs, further fostering a delineation of narrow job classifications. Apprenticeship requirements may differ across different jurisdictions and there may not be mutual recognition of qualifications from other jurisdictions. As well, apprenticeship licensing tends to be an all-or-nothing process, as opposed to graduated licensing whereby certification would be given for having completed graduated components or modules of training components.

Apprenticeship regulations that set the ratio of apprentices to journeypersons may foster shortages in those trades if those ratios are not set in a way that “clears the market.” This is especially possible since employers and unions often have conflicting interests in this area. Employers often want a high ratio of apprentices to journeypersons so as to have a future source of skilled labour, and also because apprentices are paid less than journeypersons. Unions representing the skilled trades often want a low ratio so as to restrict supply in order to maintain high wages. For the small businesses that characterise residential construction, indivisibilities may make it difficult to obtain the requisite ratios – it is not possible to have one-fifth of an apprentice at a worksite if a ratio of one apprentice to five journeypersons is required.

The apprenticeship system also has a low rate of completion, with that rate declining in the past two decades (Sharpe 1999). This suggests that the apprenticeship system, like the immigration system, is a declining source of skilled labour supply for construction.

As indicated previously, apprenticeship licensing is such that certification tends to be an all-or-nothing process, as opposed to graduated recognition for components of acquiring skills (termed laddering). Given the long training periods that are required, the “nothing” option is common with trainees dropping out with no formal certification given for partial completion. In such circumstances, more attentions should be paid to the possibility of graduated licensing for the different components of acquired skill development. This is especially the case since it could foster the development of a modular set of skill components that could be packaged in different ways to meet skill shortages, especially when multitasking is involved.

It is difficult to determine the extent to which these potential rigidities and constraints of the apprenticeship system contribute to labour shortages and the difficulties in alleviating them. It is certainly the case that they are likely to be more prominent in the non-residential construction sector than in residential construction. Albeit, as discussed, the effect can still filter down to residential construction.

#### Bias Against Vocational Education and Lack of Training Culture

Even if the apprenticeship system did operate perfectly, there appears to be a bias against such training, and vocational training in general, in North America. This can make it difficult to induce young people into the vocational education and training system. As Scott Macivor, CEO of the Ontario Construction Secretariat, explains: “There is very much a perception that there’s an intellectual lacking in the skilled trades. That’s regrettable ... the trades require good minds as well as good bodies.” Or as stated by Lito Romano, a union outreach co-ordinator: “his union has to combat the negative images people have about construction, including parents who want their children to grow up to become doctors, lawyers and computer programmers.”<sup>38</sup>

The negative image of construction industry is highlighted by a recent US survey of high school students by the National Business Employment Weekly. Out of 250 careers, construction ranked 248, third last, just two below migrant workers which ranked last. (Liska 1996).

The bias against vocational education and training can be so strong that there is even a stigma associated with vocational training. It may be regarded as the course of action taken only by the “failures” who could not “make it” in the more conventional liberal arts scheme. This, of course, breaks down for vocational skills that are attracting wage premiums and good job offers, as is the case with information technology (IT) training in the dot.coms world of the internet and the information economy. But this is the world of white-collar jobs in “click and mortar” and not the blue-collar jobs of “bricks and mortar” as in construction and especially residential construction.

The biases against vocational and technical education are fostered by high school teachers

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<sup>38</sup> Toronto Star, March 27, 2000, p. A8.



and guidance counsellors. “Educators and counsellors are, for the most part, academics. They know little about the trades themselves and will promote those occupations which they are familiar with: white collar jobs, rather than the trades.”<sup>39</sup>

Canadian employers have also been accused of not having a “training culture” meaning that they tend not to think of providing training as way to enhance skills and reduce shortages. They tend to be reactive rather than proactive -- reacting to the negative consequences of shortages when they occur, but putting less emphasis on proactive strategic human resource policies to prevent them from occurring in the first place. This may reflect a variety of factors: the poaching problem discussed previously whereby employers may lose their trainees to other firms; the ability to rely on immigration in the past; the difficulty of developing a coherent strategy in a bifurcated industry with many small employers; and the poor links between labour market needs and the education system.

The weak link between our education system and labour market needs is attributable in part to the fact that education in Canada is under provincial jurisdiction and this in turn has been passed down to local school boards. While this can facilitate gearing education to local labour market needs, it can also limit the ability of provincial governments (and even more so, the federal government) to link the education system to labour market needs. As stated by one of Canada’s experts on training and education: “The political structure clearly limits the ability of the state to intervene and bring educational requirements into line with economic, or even labour market needs, much as this is urged and discussed.” (Gaskill 1991, p. 63).

In the construction industry, and especially in residential construction, the lack of a so-called “training culture” is understandable. Employers are generally small, turnover is high (making it difficult to amortise the cost of training), time horizons are short (given the threat of bankruptcy), mobility across employers is high (making it difficult to solve the poaching problem), and worker commitment is more to their trade or craft rather than to a particular employer. In industries like automotive or computer manufacturing, the large employers contribute money and equipment to community colleges for training. In residential construction, given the proliferation of small businesses, this is not so feasible. The shelter industry is a service industry with a small capital base.

While training for many trades is offered, at least partly, in community colleges, the bias against training and vocation education also appears in our funding policies. As indicated by the Carpenters’ Local 27 (1999, p. ii, and p. 1):

“Industry bears the overwhelming majority of its own training cost burden (over 85%). This is unparalleled in other sectors of the economy. There is gross inequity between the level of government subsidisation of other post-secondary institutions (i.e., community colleges and universities) and that of industry-based institutions ... In particular, government grants have not been available to support the building of training facilities

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<sup>39</sup> [http://www.meritca.com/m\\_ph/omind97/momm97\\_4.htm](http://www.meritca.com/m_ph/omind97/momm97_4.htm)

and the acquisition of expensive, state-of-the-art equipment. This is in stark contrast to the situation in other industries that recruit workers from among the graduates of the publicly funded colleges and universities”

When the lack of a training culture and the biases against vocational education and training are discussed, the absence of an extensive apprentice system is often mentioned, with comparisons invariably made with Germany with its extensive and well-developed apprenticeship system. What is less often mentioned is that that system relies on very early streaming into a vocational/technical stream or an academic stream, and this streaming is largely irreversible (i.e., once a person is in the vocational stream it is difficult to switch into the academic stream). Such early and irreversible streaming would not likely be accepted by the general population in North America. A small degree of streaming into vocational and academic streams at the elementary level in the Canadian education system did exist in the 1960s, but that was abandoned as inappropriate since it tended to limit the subsequent choices of those in the vocational stream, and often stigmatised them. It was replaced in the 1970s by a more “cafeteria approach” involving a wider menu of choices (Radwinsky 1987). The apprenticeship system in Germany is also under federal jurisdiction -- not a likely possibility in Canada.

#### Lack of an Effective Training System

Canada has often been accused of lacking an effective training system – an obvious factor that could inhibit dealing with both short-run and persistent labour shortages. This can reflect the factors discussed previously associated with the lack of a training culture. It can also result from an earlier emphasis in Canada on passive income maintenance schemes like unemployment insurance, as opposed to more active labour adjustment strategies like training and mobility. The former discouraged persons from moving from areas or sectors of labour surplus to ones of labour shortage, while the later can facilitate market adjustments from surplus to shortage situations. On an international basis, for example, Canada ranked as one of the countries that devoted most resources to passive income maintenance and least to active adjustment assistance programs that could reduce labour shortages<sup>40</sup>.

The alleged ineffectiveness of Canada’s training system may also reflect the former jurisdictional disputes between the federal and provincial governments in this area, with “divided responsibility” often leading to no responsibility. Those jurisdictional issues have been resolved by the federal government largely shifting responsibility for the delivery of training to the provincial governments, but possibly at the expense of forgoing the development of a nationally consistent training system (except for the Red Seal program, as discussed). The former federal training system under the Canadian Jobs Strategy program, for example, had subprograms that tended to be targeted towards specific problem areas of adjustment, with one component being the Skill Shortages program, designed specifically for employers experiencing skill shortages.

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<sup>40</sup> For discussions see Economic Council of Canada (1991), OECD 1994 and Riddell (1995).

Whether the shift of responsibility for training from the federal to the provincial governments has contributed to the inability of the training system to deal with labour shortages is an interesting and open question. Union jurisdictional disputes over the delineation of craft lines and concerns over multiskilling can worsen the problems that arise because of jurisdictional disputes between the federal and provincial governments.

As indicated by the Canadian Home Builders' Association (CHBA, 1998b) the restructuring of the federal role in training represents a very clear shift from a role of provider and deliverer of training, to an increased emphasis on that of a broker and enabler. In the education and training area, the federal government (through Human Resources Development Canada) now focuses its role in a number of areas:

- Funding programs through the Employment Insurance program
- Funding industry led human resource programs
- Developing national standards through such mechanisms as the Red Seals program and the National Occupational Classification System
- Establishing Labour Market Development Agreements with most provincial and territorial governments to implement the active employment programs of the EI system in such areas as wage subsidies, job creation, skills development and self-employment initiatives
- Establishing special programs to reduce employment barriers for those with special needs including youths, Aboriginal people, and persons with disabilities.

HRDC also has responsibility for various other labour market programs including: Employment Insurance; the national dimension of the labour market information systems (including the Electronic Labour Exchange); the National Employment Service; delivering support for interprovincial labour mobility; and promoting and supporting national sector councils mainly through the Sectoral Partnership Initiatives (SPI). The SPI funds industry human resource studies, largely through the National Sectoral Adjustment Service (NSAS) – formerly the Industrial Adjustment Service (IAS). The NSAS has supported a wide range of human resource studies in various parts of the construction sector. The studies generally analyse the characteristic of the sector, the supply and demand conditions, training needs and priorities, and occupational standards<sup>41</sup>.

### Slow Response of Training Institutions

Training institutions in Canada, like community colleges, have often been regarded as slow to respond to the changing needs of labour markets. This can reflect various lags:

- A *generalisation* gap between when individual shortages across employers occur and are recognised as a more general phenomenon

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<sup>41</sup> Examples of the studies include ARA Consulting Group (1997, 1998), ARA Consulting Group and John OGrady Consulting (1997) and Praxis Research and Consulting (2000).

- A *recognition* gap between when the general phenomenon occurs and when vocational and training institutions become informed of that lag
- A *program response* gap between when training institutions become informed of the shortage and when they can establish or augment the programs to deal with it
- An *equipment response* lag given that training institutions often have outmoded equipment and new equipment is often needed to train for “real world” needs
- A *program length* gap between when a new trainee enters a training program and when they graduate
- A *job placement* gap between when a trainee completes training and obtains a job.

Given these lags, it is understandable that shortages can persist for a considerable period of time. As well, cobweb adjustments can occur, as discussed previously, with the risk that shortages have turned into surpluses by the time the responses have worked their way through the system.

### Reliance on Immigration

Historically, Canada has relied on its immigration system to fill its training needs. As indicated, this may be one of the reasons it has not developed a training culture or an indigenous training infrastructure.

This reliance on immigration worked reasonably well when immigration was skills oriented and the source countries were ones that conventionally provided construction labour. However, as indicated, the emphasis in immigration policy on family reunification and refugee status, and the shift to source countries that do not conventionally provide construction labour, has dried up that conventional source of labour supply<sup>42</sup>. There is also the issue of whether it is desirable to gear immigration to short-run shortages. This option is appealing, since the initial jobs are there, and initial experiences in the labour market may have a long-run lasting effect, especially in terms of assimilation. In that vein, it satisfies both employers (by reducing shortages) and immigrants (by providing an immediate job). It can also reduce domestic hostility and fears that immigrants are taking the jobs of domestic residents.

Nevertheless, immigration policy can have long-run ramifications for a country, and it may be shortsighted to “turn the tap on” to fill what could be temporary, short-run shortages. To the extent that many of the current shortages in construction are likely to be more structural, and not necessarily as short-run as they were in the past (as discussed previously) then immigration policy may be a viable mechanism, as it was in the past. The challenge is to reduce the lags that can prevail in that system and to determine which shortages are likely to be more long run and

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<sup>42</sup> As stated by a representative of the Greater Toronto Home Builders’ Association: “We don’t have enough new entrants into a field that has traditionally been filled by immigrants.” (Globe and Mail, April 20, p. A16).

structural.

The drying up of immigration as a conventional source of construction labour has led to proposals from both unions and employers to have the federal government allow temporary immigration of construction workers in short supply in the residential construction sector. As indicated in the *Globe and Mail* (April 24, 2000, p. A16): “One solution, insiders say is for the federal government to open the door to foreign workers, at least temporarily. In an unusual move, the builders and the union have teamed up to lobby Ottawa for such approval. They want Ottawa to provide special clearance for construction workers in short supply, such as bricklayers, carpenters and framers, for up to three years. However, if any of these workers become unemployed because of a downturn in the market, they would be required to leave the country.” This proposal has been made jointly by the Greater Toronto Home Builders’ Association and Local 183 of the Labourer’s International Union of North America, to the Minister of Citizenship and Immigration (*Globe and Mail*, September 1, 1999, p. A8).

The procedure first involves Human Resources Development Canada (HRDC) to determine that there is a need, and that it would be an economic benefit to Canada. Then Citizenship and Immigration Canada would allow temporary work permits to enter for up to a year at a time and, occasionally, up to two years.

The fact that it is a joint proposal backed by both employers and unions suggests that there are mutual gains to both sides. This is in contrast to the usual opposition of unions to immigration if it poses a threat to the jobs of domestic workers. That unions support the idea of temporary work permits suggests that the immigration can reduce structural bottlenecks that are currently reducing the job prospects of their existing membership, and that this outweighs any job losses that may occur for the displaced domestic workers.

There are precedents, such as for skilled workers in the software industry. As well, the policy already exists in the construction trades for particular construction projects. As stated by Lampert and Pomeroy (1998, p. 41):

“The most common intervention in the construction labour market undertaken by CIC is the review and processing of temporary work permits for foreign construction workers required to work on individual projects. These situations can arise when builders use new technologies, which require skills not available in Canada. These applications are sponsored by builders, and CIC reviews the applications in consultation with HRDC.”

While this is a potential “win-win” situation, there are areas of concern. This is essentially a “guest worker” situation, and such policies have raised political concerns in European countries where they have been used. There are also potential difficulties. Would these immigrants be forbidden from marrying a Canadian resident? If they do marry someone does that entitle them to stay? If the joint union-employer proposal is followed and the foreign worker were allowed to stay based on a recommendation from the employer, does this not provide a form of indentured service to obtain the coveted recommendation? Are employers

prepared to not give a recommendation, given the pressure on them from the fact that not giving one is the equivalent of deportation? If “amnesty” is proclaimed and the foreign workers are allowed to stay, does this become immigration through the “back door” and what would this do to the normal process<sup>43</sup>?

### Restrictions on Hours of Work and Overtime

Different jurisdictions in Canada have different employment standards regulations on hours of work and overtime (for employees, not for the self-employed), with there being considerable variation in those requirements both across jurisdictions as well as with respect to their applicability to different groups, like construction workers<sup>44</sup>. The regulations pertain to such factors as maximum hours that can be worked (sometimes daily, sometimes weekly), and overtime requirements after different “triggers” (sometimes daily like 8 hours per day, and sometimes weekly, like after 44 hours per week).

In some jurisdictions (e.g., federal, BC, PEI and Newfoundland) construction workers are treated no differently than are other workers. In other jurisdictions, construction workers are treated differently, for example, in being exempt from maximum hours regulations, or in having different triggers after which overtime pay is required. These differences often vary across different sectors of construction, in recognition of the different worktime requirements of the various sectors.

Clearly, restrictions on hours-worked can increase shortages since increasing hours of work is obviously one way of alleviating shortages. In two task forces that dealt with hours of work issues<sup>45</sup>, however, government regulations on hours of work were not emphasised as being significant impediments to utilising labour in residential construction. This did not mean that getting employees to work longer hours was not a problem. Instead it meant that government regulations did not appear to prevent long hours from being worked.

This could reflect the difficulty of enforcing hours regulations when both employers and employees want to use the longer hours. For example, for every “legal” hours of work beyond the maximum in Ontario (legal because permits were granted), approximately 24 “illegal” hours were worked beyond the maximum<sup>46</sup>. This could also reflect the informal nature of the worktime relationship and the increased use of self-employment especially in residential construction, and the fact that pressure from the underground economy in that sector (where hours of work regulation obviously would not be enforced), exerts pressure in the formal labour market of

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<sup>43</sup> In the 1980s, the union and employers effectively teamed up to win special amnesty for formerly illegal construction workers to remain in Canada (Globe and Mail, September 1, 1999, p. A8).

<sup>44</sup> Information for this section is largely from Donner (1987b) and Rose (1987).

<sup>45</sup> Donner (1987a, 1987b) and Donner (1994).

<sup>46</sup> Donner (1987a, p. 49).

residential construction. Even if restrictions on hours of work at one job site restricted the use of long hours, moonlighting at other worksites could likely occur, thereby effectively “undoing” the legislative restriction.

In essence, while legislative restrictions on hours of work and overtime *in theory* could reduce the ability of employers to use long hours to reduce shortages, *in practice* this does not appear to be a paramount issue. Legislative restrictions on long hours of work and overtime are not likely to contribute significantly to labour shortages in residential construction.

#### Union Restrictions on Hours of Work and Overtime<sup>47</sup>

While legislative restrictions on long hours of work and overtime are not likely to contribute significantly to labour shortages in residential construction, such restrictions in collective agreements can be more prominent. Furthermore, they can be effectively enforced given the presence of the union.

Most collective agreements in construction specify a “standard workday or workweek” after which overtime premiums (usually time-and-one half) apply. The overtime trigger tends to be after 8 hours per day or 40 hours per week in industrial, commercial and institutional construction, in residential construction and in pipelines. In residential construction, however, many agreements allow a longer workday or workweek before overtime applies. As well, piecework contracts effectively do not have an hours limit. In industrial, commercial and institutional construction, the overtime trigger is often sooner and the overtime premium is generally double time. The trigger tends to be later, at 10 hours per day or 50 hours per week in sewers and watermain and in road construction.

In essence, the provisions in collective agreements on hours of work and overtime tend to be less restrictive in residential construction than in industrial, commercial and institutional construction. Furthermore, unionisation tends to be less prominent in residential construction, and where it exists, the informal nature of the worksite may be such that the collective agreement provisions are ignored (i.e., unionised workers put their union card “inside their boots.”). In such circumstances, collective agreement provisions are not likely to severely restrict hours of work and overtime and hence contribute to labour shortages. Formal information on this, however, does not appear to exist.

It is also possible that the more extensive restrictions in the industrial, commercial and institutional sectors of construction could actually alleviate shortages in residential construction. If workers are restricted from working long hours in the industrial, commercial and institutional sectors, or if employers do not require the long hours because of overtime premiums, workers may moonlight in the more informal labour market of residential construction.

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<sup>47</sup> Material for this section comes mainly from Rose (1987).

### Difficulties of Adjusting Other Margins Such as Effort and Hours

The previous discussion highlighted that it was not likely that the legislative restrictions on hours of work and overtime severely restricted employers from increasing the hours of work of their employees as a way of meeting temporary shortages. There may be other factors, however, that limit the ability of employers to use this mechanism.

Employees may simply be reluctant to work longer hours especially if they face the “time crunch” that is increasingly faced by the growing number of two-earner families. Furthermore, the additional family income from two-earner families may enable them to afford not to work the long hours.

As well, in residential construction (in renovation and repairs more so than in new construction) there are often natural limits to the “working day” since it is often not possible to start work on a job site before a certain time in the day. The end of the day may also be circumscribed by factors such as leaving before rush hour, or being able to work only in daylight. In renovations and repairs it may also not be feasible to work later or on weekends because the families tend to be at home when the normal workday and workweek ends. Shift work, which is a conventional way of dealing with shortages, is generally not an option. Except in new subdivisions, Sunday work may also be difficult, as neighbours may complain. Residential job sites may also have natural limits to the number of workers they can accommodate without everyone “stepping on each other.” This could make it difficult, for example, to use two unskilled workers in place of a skilled worker that is in short supply. Health and safety concerns may also make it difficult to expand the working hours if they jeopardise safety. Clearly, there is a wide range of factors that can inhibit the use of longer hours to reduce shortages in residential construction.

The same can likely be said of the other margin that often can be used to deal with temporary shortages – expanding the “effort” or “work intensity” margin, and sometimes even working “smarter, not harder”. Especially when shortages are temporary, it is often feasible to get the existing workforce to work more intensely to get the work done. This is likely to be truer, however, in regular fixed worksites where there is often “labour hoarding” or “labour redundancy” in slack periods. In those environments, employers do not always engage in layoffs in slack periods because of morale problems or difficulties of rehiring. As such, in cyclical or temporary upswings they have a reserve of otherwise redundant workers they can draw on to work more intensely.

In residential construction such reserves are not generally available since labour hoarding of redundant personnel is not likely to be prominent. Small contractors can simply not afford to keep large reserves in slack periods so as to be able to draw on them in periods of shortage. In most situations, the effort margin is already fully utilised, with the risk that any further pressure could jeopardise moral, quality or safety.



### Few Available Alternatives or Substitutes for Specific Skills

A conventional mechanism for dealing with labour shortages, especially when they persist, is to substitute other inputs for the labour input that is in short supply. Such substitution is generally more feasible in the long-run than in the short-run since the process of lining up substitutes often takes time.

Substitutes can take a variety of forms and are often subtle. Examples include:

- Substituting capital equipment for labour
- Substituting less skilled labour for the skilled labour that is in short supply
- Substituting other types of skilled workers to do part of the task in the jobs that are in short supply (e.g., increased multitasking)
- Substituting different processes that do not require the skilled labour that is in short supply (e.g., pre-fabricated components or even final products or ways of carrying out the construction<sup>48</sup>)
- Selecting different products that do not rely so much on skilled labour
- Using temporary help agencies, especially to fill very short-run shortages
- Subcontracting parts of the job.
- Increased use of self-employed independent operators
- Substituting different work processes such as piecework

In the case of residential construction, many of these substitution options are not available, especially for skilled labour. Substituting capital (e.g., technology) may not be an option if the job requires a skilled craftsperson. Substituting less skilled labour can be inhibited by union work rules (if unions are present) or by licensing and apprenticeship requirements, or because of quality concerns. Furthermore, in tight labour markets even less skilled workers are not available. Substituting other types of skilled labour is not always feasible, and other skills are also often in short supply. Substituting different processes (e.g., prefabrication of components and final products) will occur only in the very long run<sup>49</sup>. Use of temporary help

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<sup>48</sup> Alternative ways of carrying out the construction include brick versus concrete, stucco versus unfinished, wood floors or carpeting, and paint on drywall or finish coat of plaster on drywall. Each of these require different trades and hence substitutes can be sometimes made depending upon the availability of the trade.

<sup>49</sup> It is extremely difficult to determine the extent to which alternative processes such as prefabrication have arisen (or can arise) in response to labour shortages or labour cost increases in residential construction. Empirical analysis of the substitution possibilities across different inputs (including prefabricated components) used in residential construction have not been conducted. In effect, the substitution of prefabricated components for construction labour involves the substitution of the inputs that go into prefabricated material for construction labour. In cases where the prefabricated components are produced offshore, this can involve the indirect substitution of low-wage labour in less developed countries for construction labour in Canada.

agencies have been very effective in other areas, like filling shortages in office staff, but this usually works when there is a specific short-run need in a particular organisation and not a general labour shortage. Subcontracting can substitute for internal skill shortages, but the subcontractors also become scarce in times of a general skill shortage. The increased use of self-employed independent contractors can be inhibited by the uncertainty as to whether they will be deemed to be employees for tax purposes. Worse, this can lead to contractors “churning” through different independent contractors rather than trying to establish more longer run relationships with them, because the longer run relationships could be deemed to be an employment relationship and hence subject to those taxes and regulations.

The use of other inputs to substitute for skills that are in short supply is also inhibited by the fact that residential construction does not appear to have undergone the productivity enhancing technological change that has occurred in other industries. Many other industries have been transformed by technological change and the information revolution involving, for example, robotics and computers. In those other industries, business practices have generally changed with an emphasis on lean production and product quality, with human resource and workplace practices also changing to complement the business strategy. The strategic management of change is the new mantra, applying both to the business strategy and the human resource strategy.

Business practices in residential construction do not seem to be changing in the same fashion. While a systematic analysis of the reasons for this are beyond the scope of the present study, some possibilities can be suggested. Residential construction is not subject to the competitive pressures of global competition often involving imports from low-wage workers in other countries or the threat of offshore production. Competition is fierce, but it is from employers operating with a similar technology and hiring from the same labour pool. The small employers that characterise residential construction are not likely to have the means to innovate substantially. They also may have little incentive to innovate since any successful innovation could be quickly replicated by competitors. They would likely bear the full cost of any unsuccessful innovation but not be able to appropriate the full return from successful ones that can quickly be emulated by competitors. This is compounded by the fact that innovation often carries considerable risk of liability – a serious concern in residential construction.

In such circumstances, the innovations and technological changes are likely to occur in more subtle fashions, especially through different processes involving pre-fabricated products many of which can be handled directly by consumers, perhaps assisted by videos, TV programs, the internet and Home Depot type retailers. If these become more attractive as responses to chronic shortages of skilled labour – and such subtle substitutions are more feasible in the long-run -- they may become permanent substitutes for such skilled labour. In many circumstances, these different processes can also utilise skilled labour (e.g., Home Depot staff in their interaction with customers) effectively drawing off skilled labour from residential construction.

## Underground Economy

The underground economy can foster skill shortages in the formal economy if large numbers of skilled workers work in the underground economy for cash wages<sup>50</sup>. Such skilled workers may also refuse to work overtime or long hours in the formal economy if they tend to moonlight in the underground economy.

Of course, the underground economy can also be a mechanism for alleviating skill shortages in the formal economy. Especially in the areas of renovation and repairs, if clients cannot employ contractors in the formal economy perhaps because of skill shortages, they may shift to the underground economy (in spite of the risks) because it is “untaxed” and “unlicensed” and therefore often appears cheaper<sup>51</sup>.

As indicated in the introduction, almost 40% of overall residential construction is conducted in the underground economy (17% in new home building, 56% in renovation and 67% in repair). This likely reflects the introduction of the GST as well as the rise in self-employment. Furthermore, skilled workers soon attain high marginal tax rates, which therefore puts a premium on being paid in cash.

Clearly, the underground economy and the likely increase in that economy due to the GST, increased self-employment and higher tax rates may have contributed to increased labour shortages and an increased inability to deal with them in the formal sector. It may also be the case that the underground economy is a response to labour shortages. That is, if the shortages cannot be filled in the formal economy, then the underground economy may be increasingly looked upon by consumers to fill the shortages, especially in renovations and repairs.

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<sup>50</sup> This has been highlighted in various studies in the industry, many of which are summarized in Praxis (2000). “Legitimate companies cannot compete with underground suppliers on price alone since the latter’s cost are lower by as much as 40 percent. The underground economy also has a negative impact on the supply of skilled labour available to legitimate companies.” (CHBA 2000, p. 2). “Underground practices reduce the contribution base for benefit plans and weaken apprenticeship training and skills development.” (O’Grady and Lampert 1998, p. 9). “The growth in the number of individual contractors (in place of employees) would mean that there would be fewer opportunities for on-the-job training by journey persons. Those in the underground were viewed as often being highly skilled in their trade but could not take part in formal apprenticeship training ... The four Apprenticeship Directors interviewed all strongly agreed that underground construction employment was having a deleterious effect on training programs, for such reasons as the following: unreported work did not reflect apprenticeship needs; underground activities often involved individual tradespersons and therefore gave no opportunities for job-site training; underground workers had no commitment to transfer technology and were unconcerned about their impact on training programs.” (KPMG 1997, p. 5).

<sup>51</sup> Many in the industry have commented that the cost saving may be illusory, especially when quality is considered.

## Strikes and Labour Disputes

While strikes and other forms of labour disputes are generally not thought of as factors that create labour shortages, they obviously have the same effect since the workers are not available for the activity. The effect is most overt in the case of a clear strike when the striking workers are not available. But it can also occur when the collective agreement has expired and employees “work to rule” to put pressure on management to settle. Forms of working to rule include: refusing overtime; following all “proper procedures” even though they are not necessary and are not followed in normal times; working at a slow pace; exercising the right to refuse unsafe work even though that right is not normally exercised; “calling-in sick” or being absent; and in extreme cases, sabotage.

The impact is not only on the sector being struck, but also on “downstream” employers who provide goods and services to the struck sector, as well as to “upstream” users of the service.

In the construction sector, “shortages” resulting from labour disputes are illustrated in a number of recent strikes. In June 2000, concrete truck drivers ended a nine-week strike that shut down many construction projects in the Greater Toronto Area. In the summer of 1998 in the Toronto area, residential contractors were hit with a series of different strikes at different times by different trades: 2,000 drywallers, 2,000 framing carpenters, 700 concrete and drain workers, 1,000 low-rise concrete formers, and 500 sheet metal workers. A province-wide strike by heavy equipment operators that summer also brought many large construction projects to a standstill.

This series of strikes was one of the factors behind the Ontario Government’s amending the collective bargaining legislation in the construction sector. Components of the legislation include: requiring a common expiration date on the collective agreements of different trades to prevent one trade from shutting down the whole industry; requiring binding arbitration if a settlement does not occur after a period of time; and requiring the term of the contract to be three years (Ontario Ministry of Labour Fact Sheet, April 25, 2000).

## Absence of Co-ordinating Mechanisms

Shortages can occur and persist in a particular sector when there are inadequate co-ordinating mechanisms across employers to deal with the shortages. This is especially the case when there are surpluses in one area or part of the industry and shortages in the other, and employers in the shortage area are not aware of the labour pool available in the surplus area. This has been the case, for example, in hospitals suffering from severe shortages at the same time that other hospitals and wards were laying off redundant workers.

Obviously, the market can be a viable co-ordinating mechanism, since the price signals (i.e., wage premiums) in the area of shortage should serve to attract persons from the surplus

pools of labour. In fact, that is exactly what labour markets should do. Nevertheless, information problems and non-competitive constraints, as discussed, can inhibit the market mechanism from “clearing” markets in this area – especially in the short-run<sup>52</sup>.

Collective bargaining can also be a viable co-ordinating mechanism with unions providing information and being involved in training and other programs that can facilitate reallocating labour from areas of surplus to those of shortage. Nevertheless, as discussed, unions and collective agreements can also impose constraints that can inhibit market adjustments to shortages. This is especially the case given that one of the dictums of the labour movement is “to take labour out of the labour market” – that is, to protect labour from some of the vicissitudes of market adjustments.

Employer associations can facilitate adjustments to alleviate labour shortages but such associations have a variety of competing pressures as well as objectives. It is not always possible to convince the membership of the need for collective action to face a collective problem, especially when they are all competing for the same scarce resource – in this case, skilled labour. In the case of the construction industry, there is also considerable fragmentation across different dimensions: residential versus non-residential; home building versus renovations versus repairs within residential; union versus non-union; and formal versus underground. Such fragmentation makes a co-ordinated response unrealistic. In spite of this diversity, employer associations do exist in construction, and they can be involved in training and other programs that can alleviate shortages. Whether the fragmentation of the industry inhibits a more complete co-ordinated response is an open question.

Joint labour-management forums can also exist to deal with issues like labour shortages. In Canada, for example, a wide range of sector councils exist to deal with issues of mutual interest to labour and management including the delivery of adjustment programs, the administration of training funds for skills upgrading, and the establishment of industry standards (Gunderson and Sharpe 1998). Such councils, supported by Human Resources Development Canada, exist in such diverse sectors as apparel, automotive parts, biotechnology, automotive repair, fish harvesting, steel, tourism, trucking, horticulture, electronics, textiles and software. Such formal sector councils do not exist in construction or any of its subsectors. They have been proposed by HRDC, but residential construction representatives have argued that separate residential and non-residential councils would be required and that the existing structures are sufficient. With respect to the existing structures, Industrial Adjustment Service (IAS) committees, supported by Human Resources Development Canada, exist in many of the construction trades. As well, the Canadian Home Builders’ Association has a National Education, Training and Advisory Committee, which meets three times per year. Also, co-operative labour-management initiatives do exist to reduce shortages in construction as evidenced by the joint initiatives (discussed subsequently) between the Greater Toronto Home Builders Association and Local 183 of the Labourer’s International Union of North America to expand temporary immigration and provide training.

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<sup>52</sup> This was strongly emphasized in the early work of Franke and Sobel (1970).

#### 4. IMPLICATIONS FOR WAYS TO REDUCE SHORTAGES

The previous discussion highlights the reasons for, and the ways in which, labour shortages can arise and persist. This section of the report will provide an analysis of the implications of policies or actions on the part of all stakeholders – employers and their associations, employees and their representatives, and governments and related institutions such as education and training institutions.

Where relevant, the discussion will deal with the implications for the different sectors of residential construction, such as new construction, renovation and repair and maintenance. The analysis will also deal with whether the implications for the ways to reduce shortages are generic across all construction (and perhaps other industries) or whether they may differ by sector.

The format will be to generally follow the ordering of the reasons for labour shortages arising and persisting as given in the previous section. A brief recapitulation of the argument is first provided, and then the implications for the appropriate action or policy response is analysed.

##### Short-run Demand Changes and Mega-Projects

Shortages that arise from short-run demand changes and mega-projects are, by definition, temporary and should last only as long as the short-run demand increases or the mega project lasts.

The “first-line-of defence” for dealing with these shortages is to forecast the demand change *and* the associated change in the derived demand for labour. (Ways of doing this are dealt with later in the section on forecasting and managing labour demand). Forecasting the derived demand for labour should be as detailed as possible (e.g., by industry, sub-sector, occupation and region).

A “second-line of defence” is to try to proactively manage the demand changes, especially in a way that they are “smoothed out” so that they do not lead to shortages in some time periods, and surpluses in other time periods or areas. Most of this is beyond the purview of the industries affected (including the shelter industry) and usually is of broader interest for the economy as a whole. Government monetary and fiscal policy to manage business cycle fluctuations is of general benefit to the economy a whole, but the issue of shortages should remind policy makers of the “micro” consequences for particular industries of aggregate demand management policy. It should also serve as a reminder that shortages lead to structural bottlenecks which can lead to wage inflation that fuels the general inflation associated with an overheated economy.

As part of the second line of defence, mega-projects could be more subject to policy

control as an issue of demand management. Mega-projects tend to arise for a specific need (e.g., to build a pipeline or an expressway). By definition they are large and often phased-in over a particular period of time. In some cases, they cannot be easily postponed because of particular events such as the Olympics. In other cases, however, they are part of infrastructure development (e.g., expressways and airports) and their timing can be altered. Having a “shelf” of such projects to take down and implement when there is a general cyclical downswing and labour surpluses, and to put on the shelf when there are general upswings and shortages, could go a long way in effective demand management, especially in areas like construction. Of course, this does not apply to residential construction, but mega-projects in the non-residential construction sector can have spillover effects on the residential construction sector.

Once the shortages are forecasted, and demand management policies put in place to try to “smooth” out the shortages, the “third line of defence” is to remove the constraints that inhibit the main mechanism for dealing with labour shortages – the market. This, of course, is easier said than done since many of those constraints exist for other reasons. The policy strategies in these areas will be discussed subsequently in the analysis of such factors as rigidities in wage structures, apprenticeship regulations, occupational licensing, preferential hiring, restrictions on hours of work and overtime, collective agreement restrictions, the underground economy and strikes.

In summary, to alleviate skilled labour shortages arising from short-run demand fluctuations and mega-projects, consideration should be given to:

- Accurately forecasting the demand change *and* the associated change in the derived demand for labour
- Managing the demand through conventional macroeconomic policies, but also possibly by bringing mega-projects in non-residential construction on stream in a countercyclical fashion
- Alleviating the constraints that inhibit labour market adjustments from reducing shortages.

### Seasonal and Weather Related Factors

There are no obvious policy related responses from stakeholders to shortages that arise from seasonal and weather related factors since such effects are either predictable in advance (e.g., seasonal patterns) or they are out of the control of policy responses (e.g., weather). The parties themselves have to adjust to these uncertainties and likely know the best way to respond.

There certainly are ways in which the parties can adjust to unanticipated weather problems. Examples include: keeping a reserve of “inside” work that can be done in bad weather; covering part of the job site; and perhaps having a portfolio of different projects such that work can be shifted from one site to the other depending on weather conditions. In non-residential construction, and especially in renovation and repairs, this is not always feasible given the small number of (usually) sequential projects that are involved. As well, the parties themselves are likely best equipped to determine the appropriate response to the vagaries of the

seasons and weather, with no obvious broader role for policy.

There is the possibility that income maintenance schemes like employment insurance may have encouraged seasonal employment by providing income support in the “off-season.” This could increase shortages by discouraging the parties from trying to spread the work over longer seasons and, instead, bunching it up in the peak season, with the off-peak season being supported by unemployment insurance. In the extreme, employers may not be able to hire sufficient workers to reduce shortages if they have to “compete” with the unemployment insurance system. This issue, of course, is not relevant to the growing component of self-employed independent operators in residential construction.

This is not likely to be the case, however, under the reformed EI system, with its reduced benefits. In fact, as discussed previously, the reduced benefits may increase shortages by making the construction industry, with its inherent instability, a less attractive place to work.

In summary, to alleviate skilled labour shortages arising from the seasonal and weather related fluctuations:

- The parties themselves will likely know the best way to respond with no obvious role for public policy
- The recent EI reforms can work both ways, reducing shortages by making EI a less attractive alternative, or exacerbating shortages by making construction, with its inherent instability, a less attractive sector

#### Cobweb Models, Lags and Adjustment Costs

Cobweb adjustment processes occur because of the uncertainties of the demand changes and the supply responses, as well as the lags and costs in the adjustment processes. While it is difficult to forecast the demand changes and especially the supply responses, improvements in forecasting these elements would facilitate the adjustment process so as to reduce the sequential shortages and surpluses that characterise the cobweb model. “Smoothing” the demand changes would also help, as would reducing the adjustment lags and the barriers that inhibit rapid adjustment (i.e., the same initiatives that would deal with shortages due to temporary demand changes).

Flexibility in the apprenticeship system helps in this regard. The apprenticeship system is a mixture of on-the-job training while at work and off-the job training in an institutional training environment. Fairly long time lags are also involved, typically over a five-year period with on-the-job experience and off-the-job institutional training being interspersed. That mixture of on-the-job and off-the-job training provides the potential to alter the *timing* of the mix depending upon shortages and surpluses in the labour market. When there are shortages, it would make sense to have the apprentices engaging in on-the-job work since that would alleviate the shortages, and when there are surpluses it would make sense to have them engage in institutional



training since that would alleviate the surpluses. In essence, the apprenticeship system can be a buffer for the labour market, turning the tap on when there are shortages and off when there are surpluses.

In summary, to alleviate skilled labour shortages arising from the lags and adjustment costs consideration should be given to similar responses as those for dealing with short-run demand fluctuations:

- Improvements in forecasting the labour demand changes and the supply responses
- “Smoothing” the demand changes by macro policies and shelving public works and large non-residential projects in times of shortage and bringing them on-stream in times of labour surplus
- Allowing more flexibility in the apprenticeship system to expand the on-the-job training component in times of shortage and expanding the off-the-job classroom component in times of labour surplus.

### Barriers to Financing Skills Acquisition

As indicated, shortages can arise and persist if employees cannot afford the costs (often forgone income) of mobility or of acquiring the training for skill development. Even if they are willing to borrow, they may not be able to since they cannot use their human capital as collateral for a loan.

These same issues arise for general education in universities and are one of the rationales for student loan programs where the government is the ultimate guarantor. The same logic could apply to vocational education, and in fact may help reduce the bias against vocational education. The inability to borrow through conventional channels is also one of the rationales for microcredit loan arrangements which provide credit for self-employed entrepreneurs. These are sometimes made on a group basis so that there is some peer pressure to repay the loan, and there may be some group assistance in networking to establish contacts and jobs. Given the importance of subcontracting and informal job networks in residential construction, and especially in renovations and repairs, this could be a mechanism that merits more investigation to help finance the training that could alleviate shortages.

In summary, to alleviate skilled labour shortages arising from the inability to finance human capital formation consideration should be given to:

- Financial support for vocational education that is on par with that for more academic education
- Microfinance loans for self-employed construction entrepreneurs.

## Rigidity in Wage Structures

The ability of employers to raise wages in select skills to reduce shortages may be inhibited by rigidities in wage structures. These can emanate from such factors as wage compression in union contracts or in apprenticeship systems, or from government pay practices that involve uniform rates across regions. In the residential construction sector, however, these are not likely to be prominent factors given the flexibility in pay systems emanating from such factors as piece rates and subcontracting. As such, it is not obvious that there is any policy response that would reduce wage rigidities that otherwise could lead to shortages. The exception may be the wages in different phases of the apprenticeship system, if they induce shortages in that phase.

## Monopsony Where Employers Influence the Hiring Wage

Monopsony may inhibit employers from raising wages to reduce shortages to the extent that employers then also have to raise the wages of their existing incumbent workforce for reasons of internal equity. This would seem to be a distinct possibility in the construction sector, and it does tell us why we cannot always rely on the usual price mechanism of markets – raise wages -- to attract additional recruits.

The appropriate general policy response in this situation is the conventional one of simply having a larger pool of skilled labour available to fill the shortages. Although this is easier said than done, it does highlight the potential importance of such factors as training, mobility, labour market information, immigration and moonlighting in a second job. It also highlights the importance of tapping into youths as an important source of renewal – a difficult task given the bias against vocational training and manual labour<sup>53</sup>. Nonconventional sources of labour supply could also help, especially from women who now make up almost half of the general workforce, and from the Aboriginal workforce in areas where they are present.

As indicated previously, employers will use non-wage mechanisms to recruit new workers in the case of monopsony to avoid having to incur these costs for their existing workforce. This can include piece rates, subcontracting, labour brokers and extensive advertising, moving expenses and signing bonuses. In general, one can assume that employers will use these mechanisms as appropriate to their situation, and that no overall policy response to encourage these mechanisms is required.

In summary, to alleviate skilled labour shortages arising from monopsony in the construction labour market, consideration should be given to:

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<sup>53</sup> Industry participants have often commented on the fact that greater mileage in this area is likely to come from encouraging educational institutions to foster skills based training that would be relevant to residential construction.

- Enhancing the pool of skilled labour available to fill the shortages through the conventional mechanisms of training, mobility, labour market information and perhaps immigration
- Tapping into youths as an important source of renewal, especially to offset the declining labour supply because of retirements
- Tapping into nonconventional sources of labour supply such as women and Aboriginal persons
- Employers recruiting through non-wage mechanisms such as piece rates, subcontracting, labour brokers and extensive advertising, moving expenses and signing bonuses.

#### Narrow Job Classifications and Single-Skilled Training

Narrow job classifications and single-skill training can obviously prolong shortages by inhibiting others from doing the tasks. The obvious response is broader-based job classifications and multi-skilled training to equip workers for the multi-tasking.

In most industries this implies reducing the number of job classifications in collective agreements or personnel policies, and encouraging more multi-skilled training to do the wider array of tasks. This has occurred, and is part of the transformation that has occurred in many workplaces.

In construction, it could mean relaxing the jurisdictional boundaries of many of the trades – boundaries that inhibit other trades or other workers from doing at least some of the tasks. This is likely to engender considerable resistance, given the tendency of each craft to identify with and guard its own jurisdiction. It also has to carefully balance the need for flexibility to alleviate shortages, with the need to protect consumer interests in areas where it is difficult for consumers to judge the quality of the service, and where damaging and irreversible consequences may result, especially with respect to safety.

In the construction area, there is an added dimension since many workers work in a wide range of subsectors. O’Grady (1999, p. v) indicates that the majority of employees (members of the Labourers International Union of North America) have worked in more than one sector, with substantial numbers having worked in more than five sectors. As a result, he concludes “labourers are more likely to achieve above average annual hours of employment if they have the skills to work in more than one type of construction.”

In that vein, multi-skilling in residential construction could be enhanced by a sector specific residential construction apprenticeship program to complement the traditional occupational, craft based apprenticeships. A general construction apprenticeship would emphasise multi-skilling for the wide range of tasks involved in construction. It could also recognise graduated skill certification for skills acquired at different stages of apprenticing. Sector specific apprenticeships were recommended for consideration by O’Grady (1997, p. xiii) and residential construction was included as one of the sectors where the model could be considered.

In summary, to alleviate skilled labour shortages in the construction labour market consideration should be given to:

- Reductions in the narrow job classifications that may exist in collective agreements and personnel policies so as to encourage multi-tasking to do a wider range of tasks
- Multi-skilling and broad-based training to enable workers to do the wider range of tasks
- Sector apprenticeships, including ones in residential construction, as one means to provide this broad-based training relevant to a wide range of tasks in the industry

#### Licensing, Certification, Preferential Hiring and Union Control

Mandatory licensing, voluntary certification, preferential hiring, and union control of the closed shop (requiring each worker to be a member of the union) and the hiring hall (union control of referrals) can increase labour shortages in construction, largely by adding lags to the adjustment process and inhibiting the use of alternative types of employment. They can also, however, have more positive effects that can alleviate shortages. The licensing and certification, for example, can ensure that the labour supply is qualified, and this could encourage hiring that otherwise may not occur because of concern over the quality of new hires. Preferential hiring could encourage persons to enter the industry, if they felt that they would obtain a higher degree of employment security. The closed shop can facilitate the establishment of training funds, and the hiring hall can facilitate job matching.

To the extent that these regulations do increase shortages, then the obvious policy response is to relax these regulations. This is likely to meet strong political resistance from the organisations that control the regulations, as well as from the incumbent workers who tend to benefit from the reduced competition associated with the restrictions on alternative sources of labour supply.

Resistance may be reduced somewhat by programs that can be reversed (e.g., temporary immigration permits) if the shortage turns to a surplus. This resistance may also diminish somewhat by the possible win-win situation created by mutual recognition of qualifications, as in the Red Seals program (Watson 1983). The program is not universal, however, since all trades are not covered across all provinces. Such programs that can enhance mobility without compromising quality should obviously be extended and encouraged. This was the case with the 1994 federal/provincial Agreement on Internal Trade. In the labour mobility section of that agreement, the regulatory bodies are obligated to “reconcile differences in licensing standards and recognise the qualifications of other provinces/territories.”

Relaxing the regulations means confronting the trade-off that exists where the regulations serve other purposes, especially in situations where it is difficult for the customer to judge the quality of the service, and where the consequences of a mistake are severe (e.g., in the quintessential licensed profession – medicine). However, if there are other safeguards for the

consumer (e.g., public inspectors or the brand name or reputation of a contractor) then strict mandatory licensing would not seem to be necessary – voluntary certification could suffice. It must also be recognised that when regulations become too severe or costly, consumers often shift to a completely non-regulated alternative. As stated in the Construction and Maintenance Electrical Trade Labour Market Study: “Also attacking the traditional market of the electrician is the “fly-by-night” tradesperson. Operating from a van and offering a wide variety of services from landscaping to electrical work, he may or may not be fully qualified. But he is readily available and likely less expensive than his qualified competitor.” (CHBA 2000a, Appendix C10, p. v). As discussed previously, the underground economy is also an increasingly viable alternative to extensive regulation in the formal sector.

To a certain extent, a degree of flexibility is attained by the fact that the regulatory bodies and the incumbent workers who are protected by the regulations are more likely to “look the other way” if alternative sources of labour supply are used in times of shortage. The regulations could be applied in normal times and stringently applied when there are labour surpluses, but not applied or applied less stringently when there are labour shortages. Such a “tap-on, tap-off” regulatory process can be timely and thereby reduce the lags that otherwise can foster shortages, and can be flexibly applied to certain regions and sectors that may have different degrees of shortages or surpluses. It does raise the question, however, of whether customer protection is being jeopardised when the regulations are not applied in times of shortages. It also raises the issue of whether the integrity of the whole regulatory process may be jeopardised by such a “self-policing” process.

While there is not likely to be a consensus of opinion on this issue, it is likely that the benefits of flexible application of the regulations outweigh the costs. This is especially the case where the alternative to relaxed regulation is likely to be *no* regulation and “fly-by-night” work – possibly worse alternatives to the extent that customers are not protected by inspections or the reputation of contractors. Furthermore, flexible regulation can provide a credible threat to protect against the more obvious abuses that violate the public interest and public safety.

While the flexible application of regulations is likely a preferred alternative to rigid application, the extent to which the essentially self-policing bodies provide that optimal degree of flexibility is a more open question. There is a delicate balancing act between protecting the jobs of their incumbent members, and protecting the public and customers, as well as in reducing shortages that can also have adverse consequences. In that vein, it is important to have public representation (perhaps through government officials) on otherwise self-governing regulatory agencies wherever possible.

In summary, to alleviate skilled labour shortages emanating from licensing, preferential hiring and union regulations, consideration should be given to:

- Reducing mandatory licensing regulations in skilled trades and restricting them to situations where the customer and public interest cannot be adequately protected by inspections and the reputation of contractors or by the use of the less restrictive voluntary certifications

- The flexible application of mandatory licensing where it is warranted, so as to minimise the risk of the completely unregulated alternative
- Expansion of initiatives like the Red Seal program and the 1994 Agreement on Internal Trade which encourage mutual recognition and mobility
- Public representation on self-governing licensing bodies to ensure that the public interest is represented, including the interest to alleviate shortages.

### Rigidities in the Apprenticeship System

As indicated previously, rigidities and lags in the apprenticeship system can foster shortages and inhibit market adjustments to alleviate shortages. Such rigidities can be associated with the ratios of apprentices to journeypersons, the pay structures associated with each phase, the timing of each phase, the jurisdictional craft lines, union resistance to multitasking, the lack of full mutual recognition of qualifications across provinces, and the lack of graduated skills recognition for skills acquired at different phases of the apprenticeship system. Obviously, reducing rigidities can reduce the resulting shortages and facilitate adjustment to them. This has to be balanced against preserving the integrity of the system itself, since the apprenticeship system is the key source of skilled labour supply in construction.

The long lags in the apprenticeship system can lead to the cobweb type adjustment process discussed previously. Thus, forecasting the demand for the different skills as well as the potential supply responses, may help deal with those lags.

The apprenticeship system in construction is geared towards specific skills usually in non-residential construction. Such specific skills are not as important for residential construction compared to the growing need for broad-based skills in that sector. As discussed previously in the recommended policy responses pertaining to barriers created by narrow job classifications and single-skills training, sector-specific apprenticeships in the more general skills required in residential construction would help fill that void<sup>54</sup>.

In summary, to alleviate skilled labour shortages emanating from rigidities and lags in the apprenticeship system, consideration should be given to:

- Reducing the rigidities of apprenticeship ratios and pay structures if they lead to shortages
- Enhancing the flexibility of the timing by allowing more continuation of the on-the-job

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<sup>54</sup> The need for sector-based apprenticeship training in residential construction has also been identified by the Saskatchewan Home Builders' Association: "The Existing Apprenticeship programming and provincial training programs for construction trades and workers are skewed towards providing skilled workers for commercial construction. While this need clearly exists, the residential marketplace is not where these trained workers find employment. And there are few if any programs available for specialty and general workers in the low rise residential construction sector." (CHBA 2000a, Appendix C17, p. 3).

- phases in times of shortage, and more off-the-job classroom training in times of surplus
- Relaxing the narrow craft jurisdictional lines and encouraging broader based multi-skilling to go with the multi-tasking
- Sector-based apprenticeship in residential construction with broad-based training to do the variety of tasks
- Certification of different components of graduated skills and prior learning acquired at different phases of the apprenticeship
- Maintenance of a permanent data base on such graduated acquired skills and their upgrading
- More accurate forecasting of the demand changes and the potential supply responses.

### Bias Against Vocational Education and Lack of Training Culture

As discussed previously, the biases against vocational education and training, and the lack of a training culture can contribute to labour shortages in construction and inhibit the system from dealing with the shortages. Unfortunately, it is very difficult to alleviate biases and to “instil culture.” Nevertheless, practical actions are possible, as is influencing the policy process to offset the biases.

Contacts with schools by industry associations to enhance the image of construction as a career and to foster recruitment can facilitate this important source of renewal. These are occurring<sup>55</sup> and can be improved. It is especially important to emphasise the job prospects in skilled construction jobs that are occurring because of impending retirements. The scope of such “advertising” could go broader and include media ads, similar to those used to promote safety in construction. Any advertising strategy must emphasise the importance of following up with ultimate delivery of the service so as to prevent false expectations from being created.

In lobbying for training funds, it is also important to emphasise to governments the poor link between our education system and our labour market needs that is inherent in our system. As well, it is important to emphasise that large subsidies go to the more academically oriented higher education programs (despite the regressivity of such funding) compared to vocational programs (industry pays 85% of apprenticeship costs in construction), even though funding vocational programs would likely be more progressive and benefit the more disadvantaged who also find it harder to finance their training.

The lack of a training culture amongst employers, is perhaps not so much a “cultural

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<sup>55</sup> The Canadian Home Builders’ Association lists a wide range of school-to-work transition programs in various communities in which they and their affiliates operate. (CHBA, 2000a, Appendix C16). The building company, Mattamy Homes, for example, has established a large number of co-operative educational partnerships with high schools whereby students get course credits and hands-on experience in “real world” learning in communication, teamwork, decision-making, work ethic and skills development in the home building industry.

failure” but a “market failure” arising from the fact that there is little incentive to provide general training given the poaching problem from employers that do not train or pay for training. Mandatory training taxes exist in most collective agreements in the construction trades and in Quebec in general, and they provide a mechanism to deal with the poaching or free-rider problem. They are a crucial source of funds to finance the training that goes on in those unionised sectors. But they exist only in the unionised trades, which are not prominent in residential construction, and are almost non-existent in the renovation and repair subcomponent.

In summary, to alleviate skilled labour shortages emanating from biases against vocational training and the lack of a training culture, consideration should be given to:

- Enhanced contacts with schools, and possibly through the media to “advertise” the industry and to follow-up with delivery
- Emphasising the biases against vocational education and the regressive nature of much of our current funding for higher education, when making the case for support for vocational training
- Developing mechanisms to deal with the poaching problem, including a possible training tax.

#### Lack of an Effective Training System

As discussed, labour shortages may arise and persist because of the lack of an effective training system. This in turn may reflect a variety of factors, many of which have already been discussed: the poaching problem; the bias against vocational training; the poor links between our education system and labour market needs; the reliance on immigration; the earlier emphasis on passive income maintenance programs like UI rather than active labour market adjustment programs like training; federal-provincial and craft jurisdictional disputes; and the lack of certification for graduated learning, acquired skills and prior learning, as well as a data base on those components.

Changes have occurred in some of these areas – yet their impact on training in sectors like construction is uncertain. The reforms of EI, for example, may reduce shortages by encouraging the work to be spread out over longer seasons, and by reducing the viability of collecting EI. On the other hand, EI reforms may increase shortages by reducing the attractiveness of the industry itself, because the inherent employment instability is not offset by EI. Similarly, the federal government’s shifting its training delivery role to the provinces can have a negative impact on training, even though it may solve the former jurisdictional disputes. Clearly, more information is needed to sort out the facts in this important area.

In other areas, the changes that are occurring are highlighting the need to develop a better indigenous training system. In essence, the demand for skilled workers is increasing because of such factors as technological change, at the same time as the supply is decreasing because of factors such as an ageing workforce, retirement and the drying up of immigration as a source of skilled construction labour. The need for enhanced indigenous training is obvious. Recognition



of the problem is a first step in dealing with it. Expanding the joint labour-management initiatives in the training area certainly merit consideration as an element of that response.

In summary, to alleviate skilled labour shortages emanating from the lack of an effective indigenous training system consideration should be given to:

- Obtaining information on the actual effect, on training and shortages in construction, of recent initiatives such as EI reform and the federal devolution of training delivery to the provinces. These likely increase the shortage problem, although they can have effects in both directions.
- Recognition of the likely problem that is arising because the demand for skills in construction training is increasing at the same time as the supply of skilled labour is decreasing because of retirements and the drying up of immigration as a source of skills.
- Expanding industry initiatives in the training area<sup>56</sup>.

#### Slow Response of Training Institutions

Vocational and training institutions tend to respond slowly to deal with shortages because of the various lags in the system. While the obvious policy response is to reduce the lags, this is easier said than done. Nevertheless, the lags could be reduced by better and quicker forecasts of the demand changes that are occurring in various sectors of construction, as well as the possible labour supply responses. Also, more extensive use of current “real world” equipment in the training can facilitate the immediate application of the training to the job requirements.

Further, suggestions have been made to “re-evaluate several trades and determine if they couldn’t be broken down [modularised] and shorter courses designed to quickly train specialised workers.”<sup>57</sup> Shorter training courses are being established that are more oriented to general skills rather than specific trades – a “train them as need them” strategy. This need not be contrary to the need for multi-skilled training, since training modules can be established in different specialities, with the modules “packaged together” in different fashions to serve as building blocks. Furthermore, quick speciality programs can reduce the lags in the process, with different specialities taken at different times depending upon the shortages.

In summary, to alleviate skilled labour shortages that may emanate from the slow

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<sup>56</sup> The Canadian Home Builders’ Association (1998b) gives examples of training provided by various public, quasi-public and industry organizations. These include new warranty programs, courses in building codes and health and safety, special seminars and workshops provided by CMHC on such topics as health housing and indoor air quality, and construction technology training targeted for high school age women provided by the Women in Trades, Technology, Operations and Blue Collar Work.

<sup>57</sup> John Tapp, Director of Transportation and Building Trades at Algonquin College, cited in the Ottawa Citizen, August 19, 2000, p. J.3.

response of training institutions consideration should be given to:

- Better and quicker forecasting of the demand changes and possible supply responses that determine shortages (even if demand is constantly increasing due to population growth, the nature of the demand may change, for example, if a reduction in new construction induces an increase in renovation and repair)
- Quicker dissemination of that information to vocational schools, training institutions and potential trainees
- Flexibility in the programs to respond to the new information in a timely fashion, perhaps even making adjustments “mid-stream”
- Quick speciality training programs that can meet specific shortages but also serve as modular building blocks for subsequent broader-based multi-skilled training
- Utilising the newest equipment wherever possible so that trainees do not have to adjust from outmoded classroom equipment to “real world” equipment
- Flexibility in program length so that trainees can do more on-the-job training when there are shortages and off-the-job classroom training when there are surpluses of labour
- Emphasising basic generic skills that have use in a wide variety of circumstances, and that teach people “how to learn” so as to equip them for life-long learning – and constant “relearning” and upgrading
- Using new technology such as the internet and self-paced computer programs to accelerate training, facilitate upgrading and safety information, and to introduce trainees to the new information technology as well as new product information and its installation
- Recognition of graduated skills and prior learning, and the maintenance of a data base on such skills.

### Reliance on Immigration

The fact that immigration no longer provides a source of skilled construction labour has contributed to labour shortages in construction. In many ways, there is likely no “turning back the clock” although recognition of the problem is a first step in dealing with its consequences and in developing domestic skills as a response. As well, some of the drying up of the pool of immigrant labour is beyond our domestic policy control, as when it is attributable to the lack of “push factors” from the now expanding economies of much of Europe.

The changing immigration policies are under domestic policy control, and their disproportionate adverse impact on construction merits emphasis, especially as they are coming on top of other policy changes (notably EI reform and shifting of training delivery to the provinces) that are also likely having an adverse impact on construction.

In such circumstances, the joint labour-management proposal in the Greater Toronto Area to Citizenship and Immigration Canada to provide temporary work permits for construction workers in residential construction merits consideration. There can be problems associated with such practices, but a case to be made for the residential construction sector given the special and

unique circumstances it is now facing. To a certain extent this could be regarded as a compensatory policy initiative to offset any adverse consequences that the construction sector recently faced because of other policy changes such as the reform of EI, the devolution of training delivery to the provinces, and the changes in immigration policy. They would also be consistent with the Expert Panel on Skills (2000, p. 6) recommendation of “involving employers in the selection of skilled immigrants.”

Temporary work permits may also merit consideration because construction trades are not part of the special occupations that merit additional points in the immigration point system for entry. As stated in the Canadian Home Builders’ Association’s response to the Immigration Legislative Review Advisory Committee Group report *Not Just Numbers: A Canadian Framework for Future Immigration*: “the General Occupations List compiled by Human Resources Development Canada does not include construction trades. Potential immigrants with these critical skills generally receive zero points for their occupation in the immigration selection process.” (CHBA, 2000a, Appendix G1, p. 2).

Consideration should also be given to the Legislative Review Advisory Committee Group recommendation 63 to allow “a province, in co-operation with industry, [to] identify and sponsor immigrants to fill a particular niche in the labour market.” As endorsed by the CHBA (2000a, Appendix G1, p. 10): “Such a provision could be extremely useful in addressing worker shortages in certain parts of Canada.” The virtue of such an approach is that it could be industry and region specific, and therefore be particularly suited to deal with shortages. In the past two years, a number of such agreements have been signed with particular provinces to “allow the provinces to recruit immigrants more actively, and to nominate a certain number of people likely to meet the specific needs of the provincial labour markets” (*Auditor General* 2000, p. 3-11.).

Lastly, consideration should also be given to the Legislative Review Advisory Committee Group recommendations 27 and 28 to improve on procedures to recognise foreign credentials in trades and professions, and to establish national standards for equivalency assessment of foreign credentials and prior learning assessment and recognition.

In summary, to alleviate labour shortages emanating from the drying up of immigration as a source of construction labour, consideration should be given to:

- Explicit recognition of the problems that the changing immigration policies have created for labour shortages in construction, especially when they are coming on top of the effect of other policy changes
- The possibility of short-term work permits to fill specific skill shortages in construction
- The possibility of particular industries in particular provinces being able to sponsor particular immigrant groups to fill shortages
- Enhanced efforts to recognise foreign credentials and equivalency standards.

### Restrictions on Hours of Work, Overtime and Effort Margin

Restrictions on hours of work and overtime have the clear potential to increase labour shortages in construction since long hours are an important mechanism for dealing with shortages. It does not appear, however, that government restrictions on long hours are a constraining influence in construction. Resistance to long hours may come from workers themselves, especially because of the growing importance of the two-earner family which can place domestic pressures on long work hours, and which can enable the parties not to have to work the long hours. This is not an issue, however, that is under policy control and hence no obvious policy response is warranted. Recognition that long hours may be restricted for this reason, however, highlights the importance of developing other policy responses to reduce shortages.

Union restrictions on long hours are likely to be more prominent and binding, although less so in residential construction since unions are not as prominent and the restrictions are not as severe. Furthermore, the restrictions are ones that basically enable the market mechanism (i.e., overtime premiums) to be used to overcome the shortages. If this is regarded as too costly, then it is a matter to be negotiated at the next round of bargaining. Regulatory restrictions on long hours are obviously not an issue for the self-employed, those on piecework or those in the underground economy.

Certainly, time off in lieu of overtime can be a viable alternative valued by families under a domestic time crunch, and this may be less costly to employers if the overtime is worked in times of labour shortage and time-off taken in slack times. This is essentially what is done in construction, however, when long hours are worked in peak periods and layoffs are implemented in slack periods.

Adjusting the effort margin of incumbent employees can be a way to deal with temporary shortages, but this alternative is likely to have been exhausted in the construction industry, especially given the growing importance of self-employment and piecework. As well, policy responses are not obvious. It may be the case, however, that employers should pay more attention to this margin by fostering human resource policies that enhance commitment, given the increased emphasis that is being placed on high commitment workforces in general. This is especially the case as other means for employers to deal with shortages appear to be dwindling.

In summary, to alleviate labour shortages emanating from restrictions on long hours, overtime and expanded effort, consideration should be given to:

- Recognising that the growth of the two-earner family will likely make it increasingly difficult to get workers to work long hours to overcome labour shortages
- Encouraging the use of time off in lieu of overtime premiums where collective agreements exist, if it is of mutual benefit to both parties
- Increasing employer attention to ways for them to ensure a high-commitment workforce to enhance the possibility of expanding the effort margin to alleviate shortages.

### Few Available Alternatives or Substitutes for Specific Skills

Labour shortages can be fostered and sustained by the lack of available alternatives or substitutes for the skilled labour that is in short supply. Substitutes can include capital equipment, less skilled labour, other skilled workers, prefabricated processes, “do-it-yourself” alternatives, temporary help, moonlighting and subcontracting.

To a large extent in residential construction, these substitutes are not feasible or, where they are feasible, they are already occurring because of the actions of the private parties themselves. This is the case, for example with prefabricated processes and with “do-it-yourself” alternatives fostered by television, videos, the internet and “big- box” retailers like Home Depot. The latter are fostering direct contact with consumers through such mechanisms as instructional booklets, installation and renovation “seminars”, renovation loans as well as staff that are often trained in the skilled trades. The feasibility and extent of the various substitution possibilities is difficult to determine in this area however, given that they are not conventional inputs like capital that could be regarded as a substitute for skilled labour in short supply.

It is not obvious that there are any barriers to the effective utilisation of alternative substitutes, over and above those that were discussed previously in the context of occupational licensing, preferential hiring and union control of the closed shop and the hiring hall. In that vein, it is not obvious that there are any policy responses that would facilitate the use of substitutes to reduce shortages.

### Underground Economy

As discussed previously, the underground economy may be a substitute for the formal economy to avoid the taxes and regulations of the formal economy. For that reason, it may provide a way of dealing with the shortages in the formal economy, albeit at the possible expense of the consumer assuming significant risks. In the longer-run, however, it may enhance shortages in the formal economy by reducing the attractiveness of that work compared to the less taxed and less regulated work of the informal economy. Furthermore, the formal economy is more likely to provide training, and to the extent that it is weakened, so are the opportunities for training to alleviate shortages.

The policy dilemma arises because the elements that gave rise to increased underground employment – the GST, increased self-employment, and higher marginal tax rates – exist for other social purposes. In the debate over these issues, however, their impact on increasing underground employment must be considered.

Even if the underground economy reduced the consequences of shortages in the formal economy by providing an underground alternative, it must be emphasised that these are illegal

and risky activities especially because of the difficulty of monitoring quality. To rely on them to alleviate the consequences of shortage can undermine the integrity of the system. Taxes not collected from workers in the underground economy also means higher taxes on those who work or purchase in the formal economy.

For that reason, the appropriate policy response implies a mixture of clamping down on the underground economy, and reducing “excessive” regulations and taxes that foster that economy. Of course, what is meant by “excessive” is in the eye of the beholder. It does remind us, however, that market forces will often operate in subtle ways (in this case through substitution into the underground economy) so as to undo the consequences of government actions in the areas of regulation and taxation. Rightly, or wrongly, this has to be recognised.

In summary, to alleviate labour shortages emanating from the underground economy in residential construction, consideration should be given to:

- Clamping down on underground activity (recognising that this may increase shortages in the short-run)
- Reducing the “excessive” regulation and taxes that may foster the shift to the underground economy (recognising that there is not likely to be agreement on what is “excessive”)
- Informing customers of the potential risks and the importance of “getting it in writing” when obtaining estimates

### Strikes and Labour Disputes

Strikes and labour disputes can create shortages since the striking workers are not available. Strikes can also affect non-struck parts of the industry, given the inter-connected nature of the construction process.

The appropriate policy response is part of the larger industrial relations issue of when to ban strikes and require binding arbitration in its place. In that vein, there is general consensus that negotiated solutions are preferred to ones imposed by third parties. However, there is also general agreement that strikes may be banned, or at least limited, in areas of essential services to the public and where there no viable alternatives.

There is, however, wide variation across the different jurisdictions in Canada as to what constitutes essential services where there are not viable alternatives, and hence where strikes are not allowed, or are allowed only for a subset of non-essential workers (Gunderson and Hyatt, 1996). In rough descending order from more essential to less essential, the ranking is: police, fire-fighters, civil servants, hospital workers, teachers, and municipal workers. Construction workers are never in the list of essential services for which strikes are banned, although ad hoc back-to-work legislation can always be invoked if irreparable damage can result to the public interest. As well, collective agreements in mega-projects that will go on for extended periods of time in non-residential construction often involve no-strike provisions in return for other benefits

in the agreement.

The appropriate policy response to strikes in construction should not be geared to alleviating labour shortages. Instead, policy should address the more general issue of when public safety or the state of the economy is jeopardised – and not merely inconvenienced – and when viable alternatives are not available. The policy response that was taken in Ontario recently under Bill 69 for unionised construction in Ontario (and therefore relevant mainly for non-residential construction) included:

- Requiring a common expiration date on the collective agreements of different trades to prevent one trade from shutting down the whole industry
- Requiring binding arbitration after a pre-specified strike period
- Requiring long-term contracts to guarantee industrial peace over the length of the contract.

#### Absence of Co-ordinating Mechanisms

As indicated previously, labour shortages can arise and persist when there are inadequate co-ordinating mechanisms in the labour market for dealing with the shortages (e.g., for reallocating labour from surplus situations to shortage situations. Market forces and collective bargaining are often viable mechanisms, but as discussed, there are imperfections in these mechanisms that can make them part of the problem rather than part of the solution. The problems are particularly acute in construction, given the fragmented nature of the industry, and its diverse subsectors.

Joint labour-management initiatives do exist and should be encouraged, especially because they represent a “bottoms-up” solution from those closest to the problem. Formalising these initiatives into Sector Councils for different sectors of the industry merit consideration. This is consistent with the recommendations of the Expert Panel on Skills (2000, p. 44) for “the federal government to encourage the formation of sector councils in all industries, *especially those dominated by small firms* [emphasis added].” To foster effectiveness such councils should not be imposed “tops-down”, and any decision by the industry not to move in that direction must be respected.

Joint labour management initiatives have been undertaken in the training area. The Home Builders’ Association and Local 183 co-run a training centre for such skills as bricklaying, low-rise formers and house framers. Trainees can earn credits towards apprenticeships as well as entry-level jobs in construction. Students in high-school co-op courses were also involved, and a new course at Sheridan College was established to train construction site supervisors (Globe and Mail, April 24, 2000, p. A16). Carpenters’ Local 27 and employers associations support an apprenticeship and training centre in Weston Ontario. The centre is largely funded by deductions of 15 to 17 cents per hour, negotiated into the collective agreement, with some support from the Ministry of Education and Training and Human Resources Development Canada (Carpenters’ Local 27, 1999, p. 1).

Consideration could also be given to the formation of a common-skills inventory data bank of nationally available skilled workers and subcontractors (supply), as well as potential jobs that contractors want filled (demand)<sup>58</sup>. These could be accessed on an immediate basis to fill short-run temporary needs, or on a longer-term basis to fill more permanent needs. This is already done in construction through informal mechanisms such as the Tim Horton's hiring hall (as described by one commentator) where the local donut shop is the informal labour exchange. Furthermore, all contractors have their "rolodex" or network of contacts. On a more formal basis, labour brokers do the matching for a fee (the equivalent of temporary help agencies in other industries).

While these mechanisms exist and are important for matching workers with jobs so as to reduce shortages, they could likely benefit from more broad-based formal mechanisms that use internet or computer technology, where the information on availability (supply) and needs (demand) can be updated in virtual time. Information on price and qualifications can be readily available and updated. Advanced communication with cellular technology also facilitates almost instant contact and confirmation.

The Electronic Labour Exchange (ELE) of HRDC is an excellent start in this direction and has the potential for more extensive use. However, public labour exchanges often have a stigma associated with them as being a job matching service of "last resort" used by employees who cannot get a job by any other means and by employers who have no other contacts. In part for this reason the use of public labour exchanges has declined substantially over time. There is also a problem of disseminating the information to small businesses that are not always computer savvy or connected to the internet. This is certainly the case for residential construction, although there appears to be a willingness to use on-line information services. As stated in a report prepared for the CMHC (1997b, p. 9, 10) "While the findings suggest that builders have comparable technological capabilities to the overall business community, the majority of participants in the qualitative research failed to fully recognise the benefits that could be achieved through online research. In other words, many builders are equipped to access digital information but do not necessarily take advantage of this technology ... Notwithstanding this lack of technological capabilities, most interviewed participants (including small contractors) were not averse to the concept of an online information service."<sup>59</sup>

Fostering the use of such public job placement procedures is especially desirable because there are "network externalities" associated with their increased use. That is, their usefulness is

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<sup>58</sup> This would help fill the gap identified in the Residential Construction Labour Market Issues Study whereby "members of the industry do not have an understanding of how to build an inventory of skilled workers and therefore lack the ability to do long-term human resource planning." (CHBAa, 2000, Appendix C15).

<sup>59</sup> The 1997 survey evidence from that study indicated that 80% of builders had access to a computer, only about 38% used the internet. These figures for builders were slightly higher than for the broader business community.



generally enhanced when more people use them since there are a larger set of potential matches for both employers and employees. Since they are internet based, they are not really subject to “crowding.” In fact increasing the number of participants enables the users to specify more detailed requirements and thereby to improve the quality of the match. They can be updated instantaneously, and they can provide a potential database for detailed acquired skills. They can also provide a potential data base for forecasting impending shortages since they provide information on supply (employee information) and demand (employer information). If the accuracy of the requests could be confirmed, they can also provide information on reasons for the mismatches between supply and demand – that is, on where the requirements of the employers are not met by the qualifications of the employees.

To a large extent, if such an information exchange were worthwhile, it should be profitable and therefore already exist in the private sector. It would be a viable business opportunity since the services could be sold (with payment based on an acceptable match). Information, however, often has “public good” characteristics in that it is difficult to exclude non-payers (the conventional “free-rider” problem). Specifically, it would be difficult to prevent the parties who access the information from passing it on to others, and it would be difficult to prevent the parties where a match occurred from simply making their own private arrangement without paying the “finders” fee. In such circumstances, public provision of the information is merited, especially since shortages can have negative spillover effects to other workers and to the economy as a whole.

In summary, to alleviate labour shortages emanating from the lack of co-ordinating mechanisms, consideration should be given to:

- Fostering joint labour-management initiatives, including training and labour market information, to alleviate shortages
- Determining the need for and usefulness of establishing more formal Sector like Councils, possibly in different sectors of construction, albeit such support obviously has to come from the parties themselves<sup>60</sup>
- Encouraging<sup>61</sup> and enhancing internet and computer based data banks (such as the ELE) on the availability of skilled workers and subcontractors (supply) as well as on jobs (demand)
- Requiring recipients of Employment Insurance to register with the ELE<sup>62</sup>.

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<sup>60</sup> In the residential construction sector, for example, such a council could build on the National Education and Training Advisory Committee of the Canadian Home Builders’ Association.

<sup>61</sup> The Canadian Home Builders’ Association, for example, has a brochure to explain the ELE and to encourage its use.

<sup>62</sup> The desirability of this policy to encourage its use (and to encourage job search of EI recipients) has to be traded off against the possibility that this could foster the negative image of public employment agencies as agencies of “last resort” listing mainly the unemployables.

## 5. CONSEQUENCES OF LABOUR SHORTAGES

Labour shortages can have severe consequences especially in sectors like construction, given the inter-relatedness of the production process and the backward and forward linkages that are involved. The consequences depend in part upon why the shortages arise in the first place, and they are affected by how the parties respond to the process.

The most obvious and direct consequence is that the construction job does not get started or completed in a timely fashion. In the case of residential construction this can create considerable hardship on families unable to move into a new home. This is especially problematic if they sold their previous home, or terminated a lease or rental agreement. Timing is crucial in this area. In the case of renovations, families may have to live through incomplete renovations. The phrase “divorce dust” is often used to describe the dust associated with renovation; clearly reducing the period of such inconvenience reduces family stress. In the case of repairs, more severe damage can result if repairs are postponed.

Delays in the completion of a project can set up a domino effect that delays other projects, with the ripple effect spreading across a wide range of customers and other contractors. Complications can arise when permits expire because of delays, or equipment or labour has to be reallocated elsewhere. The delays can lead to higher housing prices as customers pay premiums to have projects finished<sup>63</sup>.

Quality problems may arise if “corners are cut” and less qualified workers or other inputs are used as substitutes for the skills in short supply. This can be especially problematic in residential construction since new homes are usually built on pre-sold basis. If developers’ costs rise, it is difficult to pass this on so that cutting corners becomes more likely. The problem is compounded by the fact that the customer may not always be able to judge the quality of the work, and hazards may result. In most provinces, trades that have mandatory licensing do so in part to prevent potential hazards resulting from a job that is not properly done. Thus, cutting corners in this area obviously may be risky. Furthermore, the consequences of poor quality work may not show up until after a long period of time, and it may show up only in indirect ways (e.g., poor ventilation leading to subsequent leaks, or rot, or heat loss.)

Shortages affect not only consumers, but also other workers. Shortages can create structural bottlenecks that inhibit hiring and utilising other workers who are complementary to

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<sup>63</sup> Data is available from CMHC on the average house price and months under construction for single family dwellings across 11 major cities for the years 1988 to 1997. Visual inspection of the data suggests that housing prices do rise during periods of delays when the average time to completion increases (as a result of shortages in “hot markets.”). A more rigorous analysis could be done on that data, regressing housing prices on the measure of delays, with controls for city and year, weighted by the number of new dwellings. The results would indicate, for example, the effect that an additional month of delay in housing construction would have on housing prices.

the workers whose skills are in short supply. This is especially likely in construction given the inter-relatedness of the construction process. In the extreme, if a job does not proceed because of a shortage of key personnel, no workers will be hired at that site.

The use of other less qualified labour may also pose risks at the job site if they are not familiar with the required safety procedures. The same may apply to the skilled workers if they are required to work long hours or if their “effort margin” is pushed to the limit.

If wages are raised to attract the skilled workers, this increases costs and hence housing prices (unless the higher costs of skilled workers are offset by higher productivity). This increase in wages is appropriate, however, if it is necessary to provide an incentive for the longer-run skill acquisition or upgrading or to compensate for the moving costs necessary to fill the shortage. Problems can arise, however, if former wage relativities are upset and there is pressure to restore them<sup>64</sup>, leading to escalation in all wages and hence housing prices.

Since all contractors may be “chasing after the same pool of skilled labour” there may be excessive “churning.” The higher wages and job opportunities may provide the signal for others to train or move to join that pool, but in the meantime the fixed supply is simply churned amongst different employers. As stated by Liska (1996): “As a result of shortages, contractors are outbidding each other for the same workers. This produces a higher project turnover rate, further contributing to the labor shortage problem.” The higher turnover rate in turn reduced productivity.

The competition for skilled labour can also come from other countries. The U.S., for example, has often recruited in Canada to fill its shortages of nurses (thereby contributing to Canadian shortages). The Brain Drain to the U.S. of skilled professionals, especially in the Information Technology sector, has attracted increased attention. Apparently, there is also a “Skills Drain” to the U.S. for construction trades. As stated by one union member: “My union is currently offering work permits for bricklayers who want to work in the United States for as much as \$29 U.S. an hour” (Ottawa Citizen, August 19, 2000).

The wage escalation can create the “boom-and-bust” cobweb adjustment cycle discussed previously. Wages rise and individuals decide to enter the trade because of the higher wages and good job opportunities. By the time they are trained or move, the demand shock for new construction may have dissipated and excess supplies enter the market. This, in turn, depresses wages and job opportunities, discouraging others from entering the trade. Such boom-and-bust cycles in turn require an overall compensating wage premium for the uncertainty associated with the cycles. Again, this implies higher labour costs and hence higher new housing prices in the longer-run.

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<sup>64</sup> That this is the case is outlined in *Industry Scan and Strategic Analysis: Poured in Place Concrete Industry* (1997, p. 22): “Wage rates in the construction industry tend to move in lock-step. Significant shifts in relative wages among the trades are uncommon.”

Shortages can reduce output in the industry directly if production is ceased or postponed, and they can reduce output indirectly from the higher costs and hence higher housing prices. This reduced output in the housing market has backward linkage effects to those who supply materials and equipment to the industry, reducing output in those industries. This in turn creates longer-run multiplier effects that can ripple through the economy<sup>65</sup>. As stated in the Canadian Home Builder's Association brief on the Government's Job Creation Strategy (CHBA, 1996, p. 3):

"The housing industry has enormous job creation potential. For every new housing start, roughly 2.8 person-years of employment are generated [based on estimates from CMHC provided by DRI Canada], including direct construction jobs, indirect jobs in the industries supplying inputs to the housing construction sites, and induced jobs resulting from the multiplier effect in the general economy."

To the extent that contractors try to fill the shortage by using other types of workers, jurisdictional disputes can arise. The underground economy may also become more prominent, if it is used as an alternative to fill labour shortages that arise in the formal economy. A shift to the underground economy because of temporary shortages in the formal economy can lead to a more permanent longer-run shift to the underground economy as independent contractors gear their operations to that economy. The potential negative effects of a growing underground economy are clearly stated by the CHBA (1996, p. 10):

"The proliferation of taxes and regulations affecting the housing industry has resulted in tremendous growth in underground work practices. Governments have been very slow to recognise the growth of the underground economy in construction – as well as the extremely serious effects of underground activity on government revenues, the housing industry, and the quality of housing built and renovated in Canada. A start has been done through Revenue Canada's voluntary reporting system, but much more needs to be done to combat underground practices in the industry, and to ensure that legitimate contractors and workers have a level playing field."

Prefabricated products may become more prominent in the longer-run as a substitute for the skilled labour that is in short supply. This is a rational market response to the increased costs and uncertainty of more customised work, especially when that cost and uncertainty is enhanced by skill shortages. It also creates jobs in the prefabrication industry. With just-in-time delivery, such prefabricated products are less likely to be subject to shortages. If shortages are a concern, it is always possible to hold inventories. This is in contrast to craft skills, where holding an "inventory of workers" is generally not feasible, nor is the delivery of just-in-time skills, given the lags involved in the skill formation and mobility process.

Clearly skill shortages can have severe consequences in the construction industry and in related industries, as well as in the local economy. In that vein, the consequences are best dealt with if skilled labour can be reallocated from declining sectors or regions where there are labour

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<sup>65</sup> See, CMHC and Informetrica (1997).

surpluses, to the expanding sector where there are labour shortages. This “kills two birds with one stone” – alleviating shortages in the expanding sector, and alleviating unemployment and underemployment in the surplus sector. This in turn can be facilitated by the development of a national skill bank of information on both jobs (demand) and skilled labour (supply) as discussed previously.

The effect of skill shortages in the construction industry can be illustrated by the effect of strikes in that industry, and especially of strikes of particular groups of skilled workers. This is so because, like shortages, strikes of particular trades mean that workers are not there to do the work. Domino effects occur throughout the industry and in related industries, as well as for the local economy.

In commenting on the concrete truck drivers nine-week strike in the Greater Toronto that ended in June 2000, Claude Lapointe, senior economist at CMHC, stated “the strike greatly slowed residential construction in the Greater Toronto Area ... it was a substantial factor in the 28.4 per-cent drop in housing starts in Toronto on May from the month before” (Globe and Mail, June 9, 2000, p. B5). In commenting on the series of strikes in the summer of 1998 in the Toronto area involving drywallers, framing carpenters, concrete and drain workers, low-rise concrete formers, and sheet metal workers, the president of the Greater Toronto Home Builders Association stated “Its an absolute shame. Residential construction is shut right down in the best weather and best working conditions” (Globe and Mail, July 19, 1998, p. A2). The strike by the framing carpenters alone was alleged to have “crippled residential construction this summer and delayed the completion of about 10,000 homes (Toronto Star, July 3, 1998, p. E2). The strike by heavy equipment operators that summer led a site superintendent to remark: “Its like having one part missing in a car. After a while it just won’t run” (Globe and Mail, July 19, 1998, p. A2)<sup>66</sup>.

Clearly, labour shortages in residential construction have important consequences not only for that industry, but for the broader community, given the various linkages and domino and multiplier effects that are involved. The implications are especially important in residential construction, given the hardships that can be created for families if production is halted or stalled, or if quality is sacrificed.

While there are these strong anecdotal statements about the impact of shortages in residential construction, systematic information of a more general area is not available. As indicated previously, it would be possible to systematically relate housing prices to measures of delays that arise because of shortages. This information in turn could be used in macro-forecasting models to simulate the broader economy-wide and multiplier effects on such measures as inflation, unemployment and Gross National Product.

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<sup>66</sup> Obviously the strikes had their greatest impact on the union sector. The trades continued to operate in the non-union sector.

## 6. LESSONS FROM OTHER AREAS

Shortages of labour have attracted attention in other areas, both currently and in the past. This section provides a brief discussion of a number of these areas. The focus is on lessons that can be learned from these areas, and the relevance of these lessons for residential construction, given its unique characteristics.

### Information Technologists

The current area that receives the most attention is the shortage of information technologist (IT) personnel such as computer scientists, engineers, programmers and systems analysts. In the United States, for example, the problem has been labelled “America’s New Deficit” and it has been the subject matter of a major report, *America’s New Deficit: The Shortage of Information Technology Workers* (1997)<sup>67</sup>. In Canada, the Information and Communications Technologies Sector was one of the five sectors analysed by the recent Expert Panel on Skills of the Advisory Council on Science and Technology (2000). Concern in the area is paramount since the IT sector is often regarded as a key source of “good jobs” and the engine of new growth, innovation, productivity, competitiveness and even national status. It also is regarded as having significant spillover effects on other industries that now depend on information technology.

The shortage of labour in this area arises in large part because of the phenomenal growth in the demand for IT workers emanating from interrelated forces such as the growth of the information economy, technological change, computer technology, just-in-time inventory and delivery, computer-assisted design, robotics and knowledge work. This is obvious and well-known. But for a shortage to occur, the labour supply response must be insufficient to meet the demand increase. The reasons for the slow supply response are more puzzling, especially since it is reasonably well known that this is a growth area and likely to continue. As well, there are not substantial licensing requirements or artificial barriers that inhibit the entry of persons to practice in the area.

What is most puzzling in the area of the supply response in the United States is the *decline* in the number of students receiving university degrees in computer science<sup>68</sup>. In essence, that supply response along with the demand increase is *contributing to*, rather than alleviating, the shortage. The declining supply of graduates may reflect the fact that many students do not perceive formal education as providing the practical training necessary for the industry<sup>69</sup>. As well, it is possible to work in the area without a degree and the “hot” market is snapping people up, even before they get a degree. Furthermore, the change in the industry is so rapid that the formal education may be obsolete by the time a person graduates, and it may be more effective to

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<sup>67</sup> For a contrary view, however, see Matloff (1998).

<sup>68</sup> Interestingly, this decline has not occurred in Canada (Expert Panel on Skills, 2000).

<sup>69</sup> “Wanted: Qualified Software Engineers,” *Computing Canada*, September 1996.

get the training and continuous retraining while on the job. This highlights the importance of providing generic skills that provide the basis or foundation for continuous life-long learning and upgrading.

In response to the shortages of IT workers, the following adjustments have typically occurred<sup>70</sup>:

- Salary increases<sup>71</sup>
- Hiring bonuses
- Bonuses to employees who bring in other employees<sup>72</sup>
- Stock options, perhaps as a device to encourage commitment to the organisation and to deter turnover if the options can be exercised only if the employee is still with the company in the future
- Non-wage benefits such as flexible hours, child care and on-site health clubs
- Recruiting fairs
- One and two-year programs that serve different purposes: specialty applications; upgrading; and complementary skill development for those with related skills
- Early recruiting out of universities
- Recruiting in less prominent universities
- Recruiting in more general fields, with the specialised IT training then provided in-house
- Increased use of internships to identify potential future recruits
- Increased in-house company training, and on-the-job training in general
- Internet training
- Offshore outsourcing (easily done with many computer applications and software development)
- Offshore recruiting
- Increased emphasis on attracting women and minority groups
- Increased emphasis on reallocating workers from related declining sectors (such as the defence sector in the United States)
- Public-private partnerships, usually between industry groups and educational institutions, designed to foster interest and training in the area
- Relaxing of regulations in employment standards that may inhibit the use of IT workers<sup>73</sup>

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<sup>70</sup> For discussions of these in the Canadian context, see, for example, Brenham Group (1999), Hutchison and Wallace (1997) and Souque (1997).

<sup>71</sup> A recent study by the Software Human Resource Council in Canada has documented the substantial salary increases especially in senior level IT positions, leading the president of the Council to state: "shortages are hitting home and Canadian companies are beginning to respond to the challenge." See *Globe and Mail*, October 17, 2000, p. B9, and [http://www.perssyst.com/whatsnew\\_ITsalaries.htm](http://www.perssyst.com/whatsnew_ITsalaries.htm)

<sup>72</sup> Nortel, for example, recently ran a contest with \$1 million in cash and prizes to employees who help find new recruits. (*Globe and Mail*, June 2000, p. B15).

<sup>73</sup> British Columbia, for example, recently exempted its IT professional workers from the hours of work and overtime regulations of its employment standards legislation. Although the main

- Recommendations for better data and statistics for counselling career choices and training requirements.

Interestingly, in Canada, the Expert Panel on Skills of the Advisory Council on Science and Technology (2000, p. 2) found no evidence of a generalised and persistent shortage of *technical skills* for IT workers, or for any of the other skilled groups they analysed. However, they did find:

In sharp contrast with the *technical* skills picture, but equally critical to the competitive success of Canadian industry, is a persistent shortage of people who combine strong technical abilities with *essential skills* (e.g., communications and teamwork) and *management skills* (e.g., cost control and budgeting). In all five sectors, executives reported that finding technically competent people who can work in teams, communicate effectively and apply their technical knowledge to real world business problems, is a significant challenge.

The Expert Panel on Skills also noted that the brain drain of IT workers to the US and the lack of timely labour market information contributed to the problem. As well, they indicated that while the “hard” technical skills can be imparted through formal education and training, the “soft” managerial and people skills are best acquired on-the-job, but this gives rise to the perennial poaching problem whereby employers may have little incentive to provide such training because they will simply lose their trained employees to other firms. As discussed previously, these issues were particularly relevant for construction as well.

Amongst the many recommendations of the Expert Panel on Skills, the ones that are most relevant for our purposes are:

- Create a Centre for Labour Market Statistics at Statistics Canada to provide timely information on labour demand and labour supply
- Encourage initiatives to recognise informal learning and experience as part of formal qualifications (an initiative that construction industry participants have particularly emphasised)
- Encourage initiatives to improve internal labour mobility within Canada, including the mobility provisions of the Agreement on Internal Trade, initiatives to facilitate common standards and qualifications, and initiatives to recognise informal learning and experience as part of formal qualifications
- Involve employers more in the selection of skilled immigrants
- Expand the immigration procedures for the recruitment of temporary workers to fill skill shortages
- Facilitate the recognition of qualifications of skilled immigrants, including the recognition of competencies acquired through experience and informal learning

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rationale was to attract IT employers, it could also reduce the consequences of shortages by enabling the employees to work longer hours. *Human Resources Reporter*, Feb. 22, 1999, p. 1.



- Expand “work studies” and other experience-with-work programs in the education system
- Build stronger links between schools and the world of work
- Emphasis the potential role for Sector Councils to deal with skill needs and linking work and school
- Provide formal training for skills councillors
- Attract more young persons to apprenticeship programs
- Make lifelong learning a national priority, including through internet technology

### Tool and Die Makers

Shortages of tool-and-die makers were often reported in the 1970s<sup>74</sup>. The shortages resulted from various factors:

- Dramatic fluctuations in demand
- Lags and other rigidities in the apprenticeship system
- Low completion rates of tool-and-die apprenticeships in large part because in slack times, apprentices were laid off and hence did not get the on-the-job training and experience for their certification
- Lack of an indigenous training system in part because of reliance on immigration and in part because of the poaching problem
- Wage rigidities in collective agreements and lack of substantial wage premiums for these jobs
- Concerns that raising wages to attract in new recruits would upset wage relativities.

Employers often responded to these shortages in a variety of ways:

- Overtime
- Subcontracting
- Recruiting outside the country
- Substitution of less skilled workers
- Increased training
- Wage premiums.

Currently, Job Futures 2000 designates chances of finding work in this occupation as “Good.”<sup>75</sup> Shortages in this area appear to no longer be such a key issue in part because technology (e.g., computer-assisted machine operation) has changed the nature of production in this area. This of course, has increased the demand for IT workers to design and implement the computer-assisted technology, but it has reduced or eliminated the chronic shortages of tool-and-die makers.

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<sup>74</sup> These are discussed in Meltz (1982) for Canada, and Franke and Sobel (1970) for the US.

<sup>75</sup> <http://www11.hrdc.drhc.gc.ca/jobfutures/>

## Nursing

Nursing is another area that has been subject to chronic shortages especially in the 1970s and 1980s,<sup>76</sup> and re-emerging today. The shortages were generally not across all occupations or hospitals or regions, but rather have occurred in specific specialities (e.g., long-term care, critical-care and psychiatric-care), specific hospitals (e.g., in new hospitals opening up) and specific regions (e.g., isolated areas).

Various factors have contributed to the shortages:

- A growth in demand that was not accompanied by a supply response in part because of earlier cutbacks in nurse training facilities (cutbacks that were made because of an earlier nursing surplus). This suggests a cobweb model at work.
- A reduction in the supply of nurses available for hospitals, as nurses have increasingly shifted to other employment in nursing agencies, nursing homes and homes for the aged as well as temporary help agencies.
- Some of that shift has occurred because these other areas are more accommodating to nurses preferences for part-time work and less shift work, and they provide cash wages rather than fringe benefits that are often not valued by nurses, in part because they are covered by their spouse. In essence, hospitals have not been creative in their work scheduling or compensation systems.
- Rigid wage structures (and budget limitations) have inhibited the use of compensating wage differentials to attract staff into the less attractive nursing jobs, and wage compression has reduced the monetary incentive to acquire advanced training in nursing. The rigid wage structures and wage compression<sup>77</sup> reflect the fact that nursing is highly unionised with centralised bargaining, both of which foster wage rigidities and wage compression (Meltz 1994).
- Shortages in the US have often spilled over into Canada as US hospitals have often engaged in active recruiting campaigns in Canada, leading to a brain drain from Canada.
- Hospitals have often been reluctant to raise wages to close shortages in specific specialties because of what this may do to their whole wage structure (i.e., they often behave as monopsonists, as discussed previously)<sup>78</sup>.

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<sup>76</sup> These are discussed in Meltz (1988) for Canada, and Franke and Sobel (1970) and Yett (1975, 1976) for the US.

<sup>77</sup> A construction industry participant indicated that a similar issue also arises in construction when there appears to be an insufficient wage premium for the additional responsibilities of jobs like being a foreman.

<sup>78</sup> Prior to 1974 there was a persistent shortage of Registered Nurses. In 1974-75, the profession unionised across Canada and wages increased by 50% in one year. The shortages disappeared (Stager and Meltz, 1977). Clearly market wage increases of that magnitude will dissipate shortages. The question is, at what cost in terms of costs of health care and perhaps the jobs of Registered Nurses, as hospitals will obviously seek substitutes for the more

- Professional licensing requirements have often made it difficult to substitute “downwards” and use less-skilled groups to fill shortages of skilled personnel.
- Narrowly defined job categories and single-skilled training make it difficult to have existing personnel do multi-tasking across a wide range of tasks with its requirements for multi-skilling.
- The lack of systematic data banks on available personnel makes it such that new hospitals or ones that are expanding are often unaware of surplus labour pools that exist in other areas where hospitals are closing or contracting.

To a certain degree, the health care sector has responded to these underlying factors that have contributed to the specific shortages, and in many cases the shortages of the 1970s and 1980s have been alleviated or at least reduced significantly. More importantly, however, the 1990s have witnessed a decrease in demand in the health sector due to budgetary restraints, shifts to community-based care, and hospital restructuring including closings. The issue of shortages have often turned to issues of surpluses and how best to deal with the adjustment needs of displaced hospital workers (again, a possible cobweb adjustment process at work). Recently, this issue of shortages again appears to be resurfacing, reflecting such factors as the brain drain to the U.S., and the reduced training of nurses in response to the earlier surpluses of the early 1990s – again the cobweb model at work.

Of particular importance in this area is the need to ensure that expanding hospitals in particular areas that may have shortages are aware of the surplus labour in the contracting sectors of that industry. The same applies to the surplus labour in those sectors. Reallocating labour from the contracting to expanding sectors is certainly a win-win strategy both for the hospitals experiencing shortages, and the redundant health care personnel. As well, the need for labour market information and planning is highlighted so as to smooth the fluctuations between shortages and surpluses (Meltz 1988).

Whether the issue of shortages will continue in this sector if health care needs expand because of an ageing population with longer life expectancy is an interesting and important question. The issue may become even more critical if the smaller population base that will be paying for the health care costs of their predecessors is either unable or unwilling to pay for those costs.

## Doctors

Shortages of doctors in specific regions and specialities are also an issue of concern in the health care sector. Such shortages arise in large part because market forces of supply and demand are not used to determine the pay of doctors. This reflects the concern that such market based pay determination would be inappropriate in an area where the provider of the service

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expensive labour.

controls both demand (i.e., telling a generally uninformed patient what services are necessary) as well as supply (i.e., the professional licensing requirements regulate entry into the profession). The concern is also that expanding the supply of such medical personnel will not necessarily alleviate shortages because in this area “supply creates its own demand” – that is, more doctors may simply create more demand for their services (since they effectively determine demand) and it may not be the case that this will substantially improve health outcomes.

Charging higher fees or “user charges” to patients to ration demand in areas of doctor shortages is also not allowed because of the concern that this would erode the universal access principle, and create a two-tier system based on ability-to-pay. Rationing is done largely on the bases of queues or waiting lines for procedures, rather than on the basis of price. Some have argued, however, that this still creates a two-tier system, based on “who you know” and whether you can afford to go to the US for such procedures.

In place of market based determination of pay for doctors, fee structures are negotiated between the government and doctor representatives, with fees being set for the specific procedures that are performed. The fees themselves are not adjusted upwards in areas of shortages, nor are doctors directly allowed to charge higher fees to reduce shortages. Normally, higher fees would reduce shortages by reducing demand for the higher priced service, and increasing the supply of providers of the service. As indicated, however, in this area, demand is largely influenced by the provider of the service, and supply is controlled by the profession and governments in various ways: deciding on the number of “seats” in medical schools; licensing requirements that determine who can do what procedures; and requirements with respect to immigration and recognition of qualifications. Extensive lags are also involved in the procedures for expanding supply from medical schools given the long time it takes to acquire the qualifications (e.g., typically five years of speciality training *beyond* the already long training of a general practitioner).

Indirect methods can be used by doctors to “raise” their effective fee. For example, they can spend less time with patients for any given procedure and hence effectively raise their “hourly pay.” As well, they can “recycle” patients through different procedures as well as office visits. Such procedures are under scrutiny, however, by the fee-paying agencies. As well, “caps” or limits can be set on the earnings of doctors so that once they reach that billing cap, they receive a smaller fee for additional services – effectively clawing back much of the additional earnings they would otherwise receive for the additional work. A drawback of such clawbacks, however, is that they can enhance shortages by creating a disincentive for such highly skilled persons to do additional work, in spite of the shortage of their skills. Such skilled personnel may cease or reduce practising after reaching the cap. One hears of anecdotal stories of skilled surgeons shifting to “hobby” activities or even doing veterinary practice where caps do not exist. Certainly, the brain drain to the US with its more privatised medicine (and market based salary determination) is a real threat, and one that is exacerbating shortages in Canada.

To try to offset the absence of market-based incentives (or the caps that limit such market-based incentives) the fee setting agencies have often established different regulatory

rules. For example, lower fees have been paid to persons who practise in areas of labour surplus,<sup>79</sup> and additional fees paid to persons who practice in areas of labour shortage<sup>80</sup>. In effect, more flexible pay systems are used to create market-based incentives, at least on the supply side of the market.

Technology is facilitating dealing with skill shortages in particular areas. For example, general practitioners in more remote areas or smaller communities can be linked up with specialists elsewhere via internet communication, and carry out procedures under the guidance of the specialist. Helicopters enable the transportation of patients from more remote areas to speciality centres. The internet is also increasingly becoming a source of information on health matters for patients directly. “Expert systems” technologies can also help medical personnel in diagnostics and recommended procedures.

The substitution of other personnel to do tasks traditionally done by doctors can also occur. Midwives, for example, can do tasks traditionally done only by doctors. As indicated, general practitioners aided by technology can also do tasks traditionally done only by specialists. The medical profession, however, is an area where jurisdictional lines are jealously guarded (not unlike apprenticed crafts) and this inhibits the use of substitute personnel for areas that may be experiencing shortages.

In essence, shortages of doctors in particular areas and specialties is a natural by-product of the regulatory method for determining the pay of doctors if market based pay increases are not allowed to ration demand and induce supply to alleviate shortages. Professional licensing, long training times, and jurisdictional protection can worsen the situation. Some flexibility is brought into the system through bonuses in areas of shortage and penalties in areas of surplus as well as access to fee based systems for some in the US. Whether these have been adequate responses to deal with shortages in the critical area is an open and interesting question.

### Implications for Shortages in Residential Construction

What lessons are to be learned for residential construction from the issue of skill shortages in these other areas? While generalisations are difficult to make, the following observations can be put forth:

- *Shortages can arise and persist for a wide range of reasons* and while restrictions on supply responses are common, such restrictions are not always present, as is the case with the IT sector where artificial barriers are not prominent.

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<sup>79</sup> For example, in Ontario in 1996, a Discounted Pay Policy was established whereby new physicians received lower fees if they practiced in areas where there was an oversupply of physicians.

<sup>80</sup> In Ontario, for example, supplementary fees are paid for emergency work in small hospitals, rural communities and physicians who practice in Northern Ontario.

- *Immigration is often regarded as a potential solution* although there is concern that this may inhibit the development of indigenous supply responses, including the development of internal training systems. As well, this will entail better procedures for the recognition of foreign qualifications, where such qualifications are an issue.
- More flexibility and *involvement of employers in the immigration of temporary workers* is also often advocated.
- Increased *professionalisation is generally not regarded as a solution to shortages* in part because the associated jurisdictional boundaries, barriers to entry<sup>81</sup>, regulations, (often) narrow job classifications, and lengthy training requirements, are often regarded as contributing to the problem. (Whether professionalisation is part of the problem or part of the solution, however, merits more scrutiny).
- The *substitution of less (formally) skilled personnel*, or personnel with related training, can be an important source of filling labour shortages, as can technology in certain circumstances.
- The private parties will *often respond in various imaginative and creative ways to deal with shortages*, although some of them may have negative implications for domestic employment (e.g., offshore outsourcing) and others such as internal training may be inhibited by the poaching problem.
- Some private responses may be *short-run solutions that could increase the shortages in the long run*. This can occur, for example, if an overheated market draws people out of the education and training programs that are otherwise important sources of skilled labour supply.
- Regulations that *inhibit market forces from operating can certainly contribute to shortages*, although the regulations obviously may serve other social purposes. Those other social purposes, however, should be assessed in light of the negative consequences that result from the critical skill shortages that result.

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<sup>81</sup> As stated by Franke and Sobel (1970, p. 298): “The shortage was most severe for the three occupations for which the entry routes were most prescribed and narrow – licensed practical nurse, medical technologist, and tool and die maker – although other factors were also important contributions to the shortage situation in these occupations. It was clear, nevertheless, that the absence of strict controls on entry facilitated adjustment. Thus, in the engineering technician occupations, upgrading of lower level personnel was the common route of entry to technician positions, and the possibilities for building on a variety of previous educational, training, and practical experiences provided valuable flexibility and increased speed of supply adjustment. They further stated (p. 294): “the multichannel of entry and diverse education routes seem to be more flexible and responsive than those which require given qualification for entry and, as in the case of medical fields, have additional licensing and accreditation criteria.”

- While some attention is sometimes paid to the possibility of *reallocating labour from surplus to shortage areas*, this may be an opportunity that is not fully exploited especially given the twin benefits of alleviating shortages and unemployment or underemployment.
- Unfortunately, *many of procedures that the other sectors have used to deal with shortages are not readily available in the construction sector* and especially residential construction, given their unique characteristics. This is the case, for example, with respect to such procedures as: work study programs (outside of apprenticeships); internships; stock options; non-wage benefits such as flexitime or childcare and fitness programs at the workplace; in-house training; and increased use of groups such as disabled persons.
- *Improved data and labour market information* on demand and supply in these areas as well as on-going labour market analysis are generally regarded as key ingredients for determining shortages, and for adjusting to them and perhaps pre-empting their occurrence.<sup>82</sup>
- *Being high profile* and having the strategic support of government helps as evidenced by the fact that many of these other areas where shortages are occurring (e.g., IT workers, doctors, nurses) are on the “radar screen” of both the general public and of governments. The construction industry may not be on that radar screen and hence not as amenable to initiatives involving such factors as improved data and labour market information, assistance in dealing with the shortages, and more flexibility in the application of regulations.

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<sup>82</sup> As stated by Franke and Sobel (1970, p. 299, 300) in their analysis of chronic shortages in six occupations (including nursing and tool and die making: “Without exception, the study of the six occupations revealed deficiencies in the availability and dissemination of relevant occupational information... The study makes clear the need for the development of more adequate occupational information at the local level and its more effective dissemination to labor market decision-makers: employers, workers, the unemployed, vocational and other educational planners, and others. Included is the need for improved projections of occupational requirements to provide the base that could make possible effective planning and coordination of the development of training facilities and programs and effective counseling in the schools.” That statement rings true today, as evidenced by the recommendation of the Expert Panel on Skills recommendation for improved data and labour market analysis. In spite of the general tendency to regard improved information as a key ingredient for determining shortages and adjusting to them, there are no systematic studies that indicate where such improved forecasting has improved any labour shortage situation. Part of the problem is that a good forecast can lead to the supply response that will prove the forecast wrong. That is, if a forecast credibly predicts a shortage, then workers should enter that occupation in response to the prediction, in which case the shortage may not come to fruition. In such circumstances, it is extremely difficult to determine if the reduced shortage was due to the forecast, or to other responses on the part of the parties, such as raising wages.

## 7. FORECASTING LABOUR SHORTAGES

In discussing labour shortages, the *lack of information* on labour demand and supply for particular skills is a contributing factor lying behind many of the *underlying causes* of the existence and persistence of such shortages. Providing such information is also a common ingredient of many of the *solutions* that are offered for reducing shortages. Even if nothing could be done to reduce the shortages, forecasting them would help the parties to *adjust* to the shortages, thereby reducing their possible negative consequences. In essence, forecasting labour shortages is an essential step in deriving solutions and adjusting to them.

Since shortages result from an imbalance between the demand for labour by employers, and the supply of labour offered by employees, then forecasting both demand and supply is important for predicting shortages. While “full-blown” occupational forecasting models provide information on both the demand side and the supply side, useful information on projecting shortages can also be had by partial information on only the demand or supply side.

This section provides an overview of how different data sources or forecasting models can be used to shed light on predicting labour shortages in Canada. The data sources and models are first outlined in general terms, and then their relevance (or more often their irrelevance) for predicting labour shortages in residential construction is outlined. For sake of completeness, data sources and models will be discussed even if their limitations are such that they cannot be used (at least in their present form) to shed light on shortages in residential construction. If appropriate, ways in which they could be modified to be useful in this area are also outlined.

The conclusion that is reached is not one of comfort or optimism. The existing data and models have severe shortcomings that make it difficult for them to be used to predict shortages in general. This is even more true for sectors like construction, given its unusual characteristics. For residential construction within the construction sector, the problems are even more severe, given the unique characteristics of residential construction.

### Vacancy Data

The most direct, and simplest, way to determine whether employers are having difficulty hiring and retaining labour is to survey them regarding their vacancies. During the 1970s, Statistics Canada conducted such a survey – the *Job Vacancy Survey*. This survey was discontinued due to budgetary reasons and the lack of a clear constituency of users.<sup>83</sup> One difficulty inherent in a job vacancy survey is the correct interpretation of somewhat ambiguous vacancy data. How long does a vacancy have to exist before it is considered problematic? Is an employer having a vacancy because it is offering less-than-competitive wages and benefits? Is an employer experiencing a vacancy because of unrealistic expectations about the quality of labour or because of inadequate recruitment practices?

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<sup>83</sup> See Meltz (1996) for a detailed discussion of these issues.



Notwithstanding these ambiguities, lack of information about the demand side of the labour market is problematic for economists and policy analysts. This lack of information on the demand side is in contrast to the more extensive information on the supply side based on the responses of individuals concerning their employment and availability for employment. Such information on the supply side is available, for example, on a monthly basis from the Labour Force Survey (LFS), with more detailed information provided every five years from the Census. In addition, longitudinal surveys such as the Survey of Labour and Income Dynamics (SLID) and its precursor, the Labour Market Activity Survey (LMAS), are able to document the frequency and duration of individuals' labour market transitions across different labour market states as well as in and out of the labour force.

The lack of information on the demand side may, in part, be attributable to the inability of firms' human resource information systems to accurately document the number, type and length of their vacancies. Further, given that human resource strategies are often key to a firm's competitive advantage, firms may be somewhat reluctant to divulge detailed information.

The upcoming Workplace and Employee Survey (WES), jointly produced by HRDC and Statistics Canada, which surveys both the demand (i.e., employers) and supply (i.e., employees) sides of the labour market will remedy this situation somewhat. In particular, the WES asks employers the following direct questions on shortages:

- Do you have any vacant positions?
- If so, how many?
- Details regarding the occupational breakdown of the vacancies (managers, professionals, technical/trades, marketing/sales, clerical/administrative, production worker, other)
- Reasons behind these vacancies (too few applications, most applicants lacked educational requirements, most lacked job experience, most declined a job offer).

This vacancy information could be correlated with data on firms' training, compensation, and recruitment practices in order to understand how "successful" firms are able to avoid, or minimise, shortages of skilled labour. While the WES will contain a wealth of information, the public availability of data will be severely constrained by confidentiality concerns. For example, while information will be collected and coded at the firm level, in order to be publicly reported, firm level data would most likely have to be reported at levels corresponding to the aggregation of numerous three-digit SIC codes. Residential construction will likely be merged with different subsectors of non-residential construction and reported simply as an aggregate construction sector. However, for research purposes, researchers with approved proposals will be permitted to access the WES master files.

## Help Wanted Index

The Help Wanted Index<sup>84</sup> published by Statistics Canada, is a measure of labour demand that reflects job vacancies of employers. The Help-Wanted Index is compiled from the number of help-wanted ads published in 22 newspapers in 20 major metropolitan areas. The index is a measure of companies' intentions to hire new workers. The greater the number of job vacancies posted, the greater the demand for labour.

This could be indicative of shortages since the jobs are presumably vacant, and the employer wants them filled. But these are not shortages in the conventional sense of chronic shortages that are persistent and not being filled. They may very well be filled in response to the advertisement – that is, there may be a supply response that closes the vacancy. Even if the ad continues, this may simply be the normal recruiting device for hiring a flow of new applicants.

For the Help Wanted Index to indicate chronic shortages it would have to be benchmarked against some notion of the normal advertisement rate used to fill jobs. A Help Wanted Index above this rate could be indicative of shortages, but again it could also simply be indicative of demand growth that will subsequently be filled by a supply response.

A more severe limitation for the purposes of predicting shortages in residential construction is that the Help Wanted Index is not disaggregated along industrial or occupational dimensions. It therefore is of limited or no use in the analysis of particular labour markets such as construction.

## Employer Surveys Providing Information on Shortages

Although surveys of vacancies are no longer conducted in Canada, some closely related surveys are undertaken. These surveys ask employers about such factors as labour shortages, recruitment difficulties, and hiring intentions.

### Quarterly Survey of Manufacturers:

Statistics Canada's *Quarterly Survey of Manufacturers*<sup>85</sup> asks employers whether they are experiencing production difficulties and, if so, the source of those difficulties. For example, in July 2000, 8 per cent of employers cited skilled labour shortages as a source of production difficulties, 2 per cent cited unskilled labour shortages as a source of production difficulties, while 85 per cent of employers had no production difficulties. Such a survey is limited to manufacturing which only accounts for about 15 per cent of overall employment in Canada<sup>86</sup>. As

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<sup>84</sup> See <http://www.statcan.ca/Daily/English/001004/d001004a.htm>, and Amoah (2000).

<sup>85</sup> Available at <http://www.statcan.ca/Daily/English/000801/d000801a.htm>.

<sup>86</sup> According to the Labour Force Survey NAICS classification, in 1999, overall employment was

well, the occupation groupings are extremely broad (e.g., skilled and unskilled) and hence do not give detailed information on which specific skills are likely to be experiencing shortages.

Such information is not likely to be of any use for construction, and especially residential construction, given the extremely different nature of the workforces that are involved. The feasibility of doing such a survey on a broader basis to cover other industries including construction and residential construction, however, may merit some attention.

#### Ontario Wage Survey:

In 1999, the Ontario Region of HRDC conducted a survey of wages paid to workers in 215 different occupations by 15,316 Ontario businesses. Included in the *Ontario Wage Survey*<sup>87</sup> was the following question: "If you had to hire new employees for this occupation, would you be able to find qualified staff within a reasonable time frame?" Since this survey provides information at the 4-digit National Occupation Classification (NOC) level, it can be a useful source for indicating labour shortages and recruitment difficulties. In fact, this survey is being used by HRDC and the Ontario Ministry of Training, Colleges, and Universities to provide additional occupational information for their latest version of the periodically released *Job Futures* publication (see below).

#### Employer Surveys of Hiring Intentions

There are also a number of employer surveys about their hiring intentions. These surveys only provide partial information about skill shortages since they say nothing about labour supply (i.e., the availability of workers to fill the hiring intentions). However, they do provide information on the demand side and, for that reason, they can be informative.

Examples of surveys of hiring intentions included those by the temporary employment agency Manpower Inc., and the Canadian Federation of Independent Business (CFIB). Manpower Inc conducts a *Quarterly Employment Outlook Survey* which asks employers whether they expect employment increases, no change in employment, or employment reductions for the upcoming quarter. Information is based on a survey of 1,600 firms and is subdivided along industrial lines including construction and also reported by city. The CFIB conducts a similar survey entitled the *CFIB Survey on Business Expectations*.<sup>88</sup> Neither survey, however, has information on hiring intentions by occupation and hence would not be useful for predicting specific skill shortages.

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14,531,200 while manufacturing employment was 2,217,400.

<sup>87</sup> Available at <http://www.on.hrdc-drhc.gc.ca/english/lmi/eaid/OWS99/>

<sup>88</sup> Available at <http://www.cfib.ca/research/reports/outlk99.asp>

## Sector Studies by Employer and Employee Groups

Employer and employee organisations also conduct studies on their own sectors, sometimes on a regular basis, and sometimes on an ad-hoc basis.

### Canadian Advanced Technology Association Forecasts:

An *employer* group - the Canadian Advanced Technology Association (CATA) – provided forecasts of anticipated industry growth to capture expected labour demand changes in its sector. This prediction was largely an extrapolation from the rapid employment growth occurring in that sector. On the labour supply side, they examined the size of the "pipeline" of engineering and computer science students in Ontario coming out of the university system. They reported that extremely high marks were necessary in order to gain entry into computer science and engineering programs. This was viewed as the major source of rigidity in the system; for various reasons universities did not have the proper incentives to match their course offerings to student demand. As the focus was on reforming the educational system, other sources of potential labour supply such as migrants from other provinces, immigrants from outside of the country, re-entrants into the labour market, or other occupational groups, were not examined. The omission of immigrants was particularly notable since they, in fact, make a sizeable contribution to the supply of computer scientists and engineers.

Nevertheless, by comparing their projection of new employment to be created (employment demand) with the number of graduates based on the current capacity of the university programs, CATA determined that there would be a shortage of 42,000 engineers and computer scientists in Ontario within five years. The Ontario government responded in the subsequent budget with the Access to Opportunities Program, which doubled the number of computer science and high-demand engineering spaces in Ontario colleges and universities.

### Ontario College of Teachers Forecasts:

An example of a study by an *employee* group is that of the Ontario College of Teachers<sup>89</sup> who forecast shortages in the teaching profession. Administrative records were examined to determine the age distribution of all licensed teachers in Ontario. Retirement rates were then applied to this teaching population to determine that 78,000 of the existing College's 171,5000 members will reach retirement age within 10 years. The implication was that severe shortages would result because of the need to replace such retirees.

This was essentially a projection based on the demand side only, and focussing only on replacement demand to replace those who retire. No other demand side factors were considered, such as the demand for teachers associated with changes in enrolment or in class sizes. The

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<sup>89</sup> See [http://www.oct.on.ca/english/ps/december\\_1998/cover.htm](http://www.oct.on.ca/english/ps/december_1998/cover.htm)

projection also did not deal with supply side changes that may occur, such as through the education pipeline or migration.

In spite of the fact that these industry studies selectively focused on limited parts of potential labour demand and supply in order to predict imbalances, they can be valuable to the extent that they have access to rich administrative data sources (e.g., teachers) and have intimate knowledge of human resource practices within their respective sectors.<sup>90</sup>

#### LIUNA Survey:

For example, in order to accurately portray the supply side of the construction sector, John O'Grady (1997) relied on administrative data from the Labourers' International Union of North America (LIUNA) pension fund, a survey of LIUNA members, the Commission de Construction de Quebec (CCQ), and the Unemployment Insurance administrative records as well as custom tabulations by occupation of the Labour Force Survey.

The survey of LIUNA members was completed by 5,688 members. It was extensive in design, with over 600 data fields. The survey solicited information on the *skill depth* and *skill breadth* of labourers. Breadth of skills refers to the number of skill-sets in which a worker has a moderate degree of competence, while depth of skills refers to the number of specific skills within a skill set. Skill breadth is an important determinant of *inter-sectoral mobility* for workers, whereas the skill depth is more important for employability *within* a specific sector. Twenty-three specific construction sectors were identified, such as residential framing, residential formwork, masonry and renovation. This survey information was used to predict new labour requirements based on changes in construction spending, adjusted for such factors as changes in labour productivity, absorption of unemployed and underemployed labour, and the construction labour force "erosion rate" as people moved out of the particular construction sector.

The various data sources were used to assess how employers could respond to the estimated changes in employment demand. Of particular note O'Grady (1997) determined that when there is an expansion in construction activity, sectors paying higher wages tend to draw workers from lower-wage sectors. Therefore, workers who primarily work in the lower-wage residential part of construction will leave that sector for the higher paying opportunities in the non-residential sectors in times of expansion. This means that the requirements for new workers will be relatively greater in the residential sector than in other sectors of construction. O'Grady determined that in Informetrica's high-growth scenario, there would be a need for an expansion of 3-5% per year in the residential sector work force after 2000.

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<sup>90</sup> This may be especially true of CATA due to the membership of Nortel, which is an extremely large employer of Canadian computer science and engineering graduates.

## CHBA Pulse Survey:

The Canadian Home Builders' Association conducts a *Pulse* survey of new home builder and renovator members to determine the major trends and issues affecting the residential construction industry. The survey has been conducted twice per year since 1990, with approximately 300 – 400 responses (slightly over 10 percent). The survey asks a question on whether shortages of trades/labour are experienced, and whether rising costs for trades/labour are experienced. The response options are: 1-critical problem, 2-more than usual problem, 3-normal ongoing problem, and 4- not a problem. Over the past 10 years, the proportion of builders indicating shortages to be a critical problem has risen fairly steadily. It is particularly an issue for "hot markets" like Ottawa and Toronto.

For example, nation wide, the proportion of respondents who indicated that they experienced shortages of trades/labour that were critical or more than usual, averaged only 11.5 percent in the first half of the 90's; during the second half of the 90's, that percentage more than tripled to 38.2 percent. In the last two surveys in the Fall of 1999 and the Spring of 2000, the numbers rose to almost 50 percent. In essence, from the early part of the 90s, to the end of the 90s, the proportion of residential home builders who indicated labour shortages to be a critical or more than usual problem increased almost five-fold, from around 10 percent to 50 percent.

The survey is useful in giving a broad indication of overall shortages in the industry. Consideration could be given to expanding it in various dimensions to provide more precise information on specific shortages. Possible dimensions include: delineating specific trades/occupation groups; additional disaggregation of specific cities; and increasing the response rate. As well, the survey allows for one-time questions to explore timely issues. This could enable exploring possible reasons for the shortages such as a reluctance to raise wages to attract new recruits because of what this will do to the internal wage structure, or a reluctance to train because of the poaching problem.

## Indirect Information for Inferring Shortages

In the absence of comprehensive data sources that *directly* measure occupational shortages, analysts are generally forced to rely on *indirect* information that generally *reflects* shortages or is a *symptom* of shortages. This is generally captured by measures of the various ways in which employers react to shortages, some of which are very difficult to detect quantitatively. For example, when faced with a labour shortage, employers may do various combinations of the following: reduce qualifications; increase training of existing staff; increase recruitment efforts through more intensive job search or higher compensation; delay or abandon production; and increase hours of existing staff. Aggregate economy-wide measures may also reflect shortages. As noted by the Bureau of Labor Statistics in the United States, "such data include trends in employment and earnings, as well as the unemployment rate for a particular

occupation." <sup>91</sup>

#### Wage and Overtime Information from the LFS:

Two common responses employers use to deal with shortages are increased wages and increased overtime hours for existing staff. In essence, shortages can be said to exist if there are unusually large increases in wages in a particular job and/or unusually large amounts of overtime being worked.

Caution should be exercised if such measures are used as indicators of shortages since wage increases and overtime work can occur for reasons other than to deal with shortages. For example, wage increases could occur to compensate for changes in the nature of jobs such as reductions in fringe benefits, or increases in risk or in the human capital requirements of the job. Overtime may occur because of factors that make it less attractive for employers to hire additional workers, and more attractive to work the existing workforce longer hours. This could be the case, for example, if expected termination costs increased, or if payroll taxes increased and the existing workforce were at the maximum or ceiling of the payroll taxes. In essence, increases in wages and in overtime hours can occur for reasons other than labour shortages. Nevertheless, they can also occur as mechanisms to deal with shortages, and hence they may be viable indicators of labour shortages.

Information on changes in wages and overtime can be derived from the Statistics Canada's Labour Force Survey (LFS), based on the individual as the unit of analysis. The LFS is now utilising the North American Industry Classification System (NAICS)<sup>92</sup> with the following levels of industry disaggregation potentially available:

- *2-digit level: Construction Sector (23)*  
Comprises establishments primarily engaged in constructing, repairing and renovating buildings and engineering works, and in subdividing and developing land.
- *3-digit level: Prime Contracting (231)*  
Comprises establishments primarily engaged in constructing complete works, whether buildings or engineering works. Projects undertaken by these establishments typically have several components, varying proportions of which can be subcontracted to trade contractors or done by the establishment's own labour force.
- *4-digit level: Building Construction (2312)*  
Comprises establishments primarily engaged in constructing residential and non-residential buildings. Contractors primarily engaged in work on existing buildings, involving more than one

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<sup>91</sup> See Veneri (1999).

<sup>92</sup> See [http://www.statcan.ca/english/Subjects/Standard/standard\\_classifications.htm](http://www.statcan.ca/english/Subjects/Standard/standard_classifications.htm) for info. about the NAICS

trade are included in this industry group. Work on existing buildings includes repairs, renovations, additions, rehabilitation, retrofitting and conversions.

- *5-digit level: Residential Building Construction (23121)*

Comprises establishments primarily engaged in constructing residential buildings, such as houses, garden homes, cottages, apartments and townhouses. Establishments primarily engaged in erecting prefabricated homes are also included. Examples include:

- Apartment building, construction
- Condominium developers
- Cottages, construction
- Log home, construction
- Mobile home repair, on site, contractors
- Prefabricated homes, erecting
- Residential house construction
- Residential renovation, contractors

Obviously, the more disaggregate 5-digit level would be best for ascertaining wages and overtime as indirect measures of labour shortages in residential construction. However, wage and overtime information at this level of disaggregation is not available in the published sources or through unpublished but publicly available, sources such as CANSIM (the CANadian Socio-economic Information Management System)<sup>93</sup>. Special custom tabulations would be required to access data at this detailed level, with Statistics Canada determining the level of disaggregation that is permissible to be made publicly available. Also, the extent to which such detailed industry information could be combined with detailed occupation data would also have to be determined. The relatively small sample size of the LFS (60,000) households might prove restrictive. For example, only a small number of individuals in the sample would work in NAICS, 23121 Residential Building Construction. If this number were too small, decomposing this industrial level according to occupations would prove difficult, if not impossible. Regional or provincial disaggregations would be even more difficult.

Statistics Canada wage data do not contain information on non-wage forms of compensation such as the granting of stock options – a form of compensation that is increasingly being used in high-tech information sectors to alleviate shortages. Surveys conducted by non-government consulting firms such as Watson Wyatt or Towers Perrin often provide information on such features and this may provide a more accurate portrayal of total compensation trends. This is not likely to be of relevance to the construction industry, however, given the nature of employment in that industry.

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<sup>93</sup> For more information about CANSIM see: <http://www.statcan.ca/english/CANSIM/>



## Wage and Overtime Information from SEPH:

Wage and overtime information is also available from the Survey of Employment, Payroll, and Hours (SEPH) which is an establishment- based survey. SEPH data contains information about wages, employment levels, and hours of employment, for approximately 200 industries at the national and provincial/territorial level. While the LFS is now utilising the North American Industry Classification System (NAICS), the SEPH still uses the Standard Industry Classification (SIC) system.

In the SEPH data from CANSIM, the construction sector is decomposed into three sub-sectors: (1) building, developing and general contracting, (2) residential building and development and (3) non-residential building and development.<sup>94</sup> However, the SEPH data does not incorporate “own account” employment or non-paid employment of entrepreneurs compensated through returns to unincorporated business enterprises (Informetrica 1996, Appendix E), both of which can be important in residential construction. Furthermore, the SEPH data would not be of direct use in forecasting specific skill shortages in residential construction because there is no occupational disaggregation.

## Unemployment:

A low unemployment rate for particular skills in particular industries may also be an indirect measure of labour shortages. However, a major weakness of examining occupational-specific unemployment rates is that the occupational unemployment rate is calculated based on a person's last job, rather than the job longest held, or occupation in which he or she is trained, or looking for work. For example, if a dry-wall installer takes a temporary position as a bartender and then returns to search for work as a dry-wall installer, his or her unemployment would be as recorded as a bartender. This can be a particularly important issue in construction where moonlighting in different jobs can be particularly important.

Another problem with the occupational unemployment rate as a measure of shortages is that it does not capture the underemployment of highly skilled workers. When workers trained in highly skilled occupations are unemployed in those occupations, they will likely “move down” and obtain work in less skilled occupations. They will be recorded as employed in the less skilled job even though they are effectively “unemployed” in their higher skilled job where they would prefer to be employed. In effect, they are underemployed, but this is not captured in the Labour Force Survey. This underestimates unemployment in their former skilled job in the sense of qualified personnel wanting those jobs. As such, if a shortage begins to appear in their former skilled job, they likely will be rehired in such skilled positions. There will not be a reduction in unemployment in those skilled jobs because they were not unemployed in the sense of being recorded in the labour force survey as looking for work in their former job. In fact, there may be

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<sup>94</sup> Information about SEPH custom tabulations from Labour Statistics Division can be obtained from Jean Leduc (613-951-4090; fax: 613-951-4087; labour@statcan.ca).

an increase in unemployment in those jobs if they leave their unskilled job and begin to search for employment in their previous skilled jobs.

### Employment:

Rapid employment growth in particular occupations in particular industries may also be an indirect measure of labour shortages. Such growth likely reflects a significant rise in demand for that type of worker. Of course, this need not be a shortage if the demand increase is met by a supply response. Furthermore, the lack of employment growth need not reflect the absence of a shortage. It may in fact reflect the absence of a supply response to meet the demand increase, in which case the lack of employment growth occurs because of shortages.

For employment growth to be indicative of demand increases leading to shortages, it has to be accompanied by measures indicating that the employment growth was not accompanied by a supply response. By itself, it is of limited use.

### Combination of Indirect Indicators

Each of the previously discussed indicators may provide some indirect evidence of shortages by reflecting the symptoms of shortages (e.g., rapid increases in wages, overtime and employment, and reductions in unemployment). Each had weaknesses, however, and would provide only a limited partial indication of possible shortages. A *combination* of such indicators (and other ones) however, may provide a more comprehensive picture.

Such a combined indicator has been constructed in the U.S. to designate certain shortage occupations<sup>95</sup>. This was done to assist the U.S. Immigration and Naturalization Service in allowing immigration to fill specific job shortages.

The approach that was taken to determine occupation shortages was to produce a numerical shortage index (a ratio of supply to demand whereby a low numerical value is indicative of a shortage – low supply relative to demand) through the combination of seven labour market indicators:

- occupational unemployment rate,
- change in occupational employment,
- change in weekly wages by occupation
- predicted long-run employment growth (generated from the Bureau of Labour Statistics occupational projection model),
- replacement demand by occupation (predicted attrition due to retirements and deaths),
- labour certifications by occupational group per 100,000 workers (such certifications are

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<sup>95</sup> See Cohen (1995).

employer sponsorships of foreign workers for residency purposes, based on the assertion by American employers that they cannot hire American workers for those jobs).<sup>96</sup>

It is interesting to note that proposed changes to the Canadian selection system for immigrants downgrades the importance of forecasting occupational shortages. The idea espoused is that in the "New Economy" workers will be changing careers more often, and therefore the emphasis should be on more broadly defined transferable skills. As stated in a Citizenship and Immigration Canada policy statement<sup>97</sup>:

The new legislation will modernise the selection system for skilled workers, shifting the emphasis from the present occupation-based model to focus more on choosing skilled workers with the sound and transferable skills sets required to succeed in a fast changing, knowledge-based economy.

Working in the other direction, it would appear that the accurate prediction of occupational shortages is becoming increasingly important for the purposes of new training initiatives. For example, the Ontario Government recently introduced the Strategic Skills Investment initiative<sup>98</sup> which "supports effective partnerships that develop critical skills necessary for business competitiveness in a rapidly changing world." A recently announced successful program was one to "expand graduates and develop state-of-the-art simulation training for heavy equipment and craning. An additional 250 crane and earthmoving operators will be trained annually." Obviously, an accurate forecast of shortages of crane operators is a crucial criterion for such an initiative.

This echoes back to the original impetus for developing occupational projection models in Canada. As Meltz (1996) states:

The predecessor of HRDC, the Federal Department of Labour, advocated a large training program to deal with the structural aspects of unemployment, the upward shift in skills for which many youth were not prepared. The result was the wide-ranging Technical and Vocational Training Act of 1960, which funded capital projects in the building and equipping of schools as well as the funding of training and retraining programs. The question that kept arising at that time was "what should we train people for?" No one really knew.

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<sup>96</sup> This is similar in Canada. Immigrants can get 10 points for arranged employment (a guaranteed job offer from a Canadian employer that has been validated by a Human Resources Canada Centre certifying that no suitably qualified Canadian or permanent resident is available to fill the position.)

<sup>97</sup> See [http://www.cic.gc.ca/english/about/policy/overview\\_e.html](http://www.cic.gc.ca/english/about/policy/overview_e.html) for an overview of C-31.

<sup>98</sup> See the Ontario Ministry of Economic Development and Trade's website for specific details (<http://www.ontario-canada.com/medt>)

## Occupational Projections

The most sophisticated method for determining skill shortages is by use of occupational projection models. As seen above, results from occupational projection models can be combined with other labour market indicators to determine shortage situations. The data requirements for such models are rather onerous. Projection models require, at a minimum, estimates of employment by industry generated by macro-econometric models. They also require data which describe the occupational composition of all the industries to be forecast.

### Generic Components:

There are a number of steps involved in undertaking an occupational projection. These include:

- population projections,
- macroeconomic forecasts including forecasts of labour demand by industry,
- translations of industrial labour demands to occupational demands
- supply side and retirement forecasts.

The first step is a population projection. In order to predict a change in population, the following components must be projected: births, deaths, immigration and emigration. Birth and death rates depend largely on the age structure and corresponding assumptions regarding fertility and mortality, while immigration and emigration may be exogenously determined (e.g. assume annual immigration into Canada of 250,000) or these may be functions of other economic variables (e.g. immigration depends on Canadian and foreign unemployment rate differentials).

The population projection then serves as input into the macroeconomic forecast. Population change impacts the supply side through labour supply, and the demand side through consumption and government expenditures. Some of the other major economic variables that have to be forecast include the exchange rate, changes in productivity and variables based on assumptions about government fiscal policy (e.g. tax rates and deficits) and monetary policy (e.g. interest rates and inflation). In terms of the occupational projection, the most important set of variables forecast from the macro-econometric models is industrial growth rates. These growth rates, in turn, determine the amount of labour needed to produce the forecast level of output. The amount of labour depends upon the relative cost of labour compared to capital and prevailing technology and labour productivity (i.e., assumptions embedded within production functions).

The employment demand changes based on forecasts of industry growth or contraction are only one source of the employment demand. The other source of employment demand comes from replacement demand or attrition due to retirements and death. Attrition is usually determined somewhat simplistically by "aging" the current workforce and then applying attrition rates based on current labour force participation patterns. This is done separately for males and females. One shortcoming of this method is that retirement rates are not specifically related to the occupational group in question.

Since macro-econometric models specify employment on the basis of industry rather than occupation, then the employment demand by industry must be converted into employment demand by occupation. To do this conversion, data on the occupational composition of each industry is required. This level of detail is usually too great to rely entirely on relatively small-sized surveys such as the Labour Force Survey (LFS). Instead, large scale Census data is used. The resulting (census-based) industrial-occupational information, termed the co-efficient matrix, is really the heart of the occupational projection model.

If this co-efficient matrix is applicable to the entire forecast period, this is termed the "fixed-coefficient" method of occupational projection. One methodological problem with simply relying on the most recent census is that the resulting forecast will be highly dependent on the stage of the economic cycle. The predicted growth in an occupation is entirely dependent on the forecast industrial growth pattern.

An alternative method, the "variable-coefficient" approach, allows the occupational compositions to change over the forecast period. For example, suppose that within the construction industry, it was determined that 5 per cent of the positions were bricklayers. Unlike the fixed-coefficient approach that assumes this 5 per cent relationship holds in the future, the variable approach allows this number to change over the forecast period. Predictions of the changes in the occupation coefficients within each industry are based on forecasts from at least two data points on the occupational composition of each industry relationship. Typically this is based on two censuses or one census supplemented with occupational-industrial employment data from the LFS and/or SEPH. This approach would also allow for the prediction of upskilling or deskilling within industries.

These previous steps are fairly generic and can be found in almost occupational projection models. The most obvious place distinguishing where occupational projection models differ is the specification, or lack of, the supply side of the labour market.<sup>99</sup> Models which contain the complete supply side of the labour market contain the following sources of supply: school leavers, net in-migration, those returning to the labour market and job changers. Labour supply is particularly hard to forecast because of the lack of direct correspondence between sources of supply and occupations. While some occupations have fairly obvious pre-requisites (e.g. lawyer needs a law degree) this is probably the exception rather than the rule, especially for lower-skilled occupations, where many different backgrounds suffice. Inter-occupational mobility is similarly difficult to forecast because of the many possible career paths in existence. Predicting occupational patterns of recent immigrants also would be a complicated task. For example, it would appear that occupational patterns would depend on the levels of immigration, the composition of immigrants by selection stream (e.g. economic, family, or refugees), and the

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<sup>99</sup> At the Canadian national level, the complete supply side is forecast whereas at the provincial level only certain provinces do so (e.g. Ontario, see [http://www.ont.hrdc-drhc.gc.ca/english/lmi/eaid/occ.info/ojf/jobf\\_e.html](http://www.ont.hrdc-drhc.gc.ca/english/lmi/eaid/occ.info/ojf/jobf_e.html)). Also, projections produced by the Bureau of Labor Statistics in the United States do not forecast labour supply. See [http://www.bls.gov/opub/hom/homch13\\_a.htm](http://www.bls.gov/opub/hom/homch13_a.htm)

source countries of immigrants.

As a methodological issue, the employment demand forecasts generated by macro forecasting models are used to generate the occupational demand forecasts used in forecasting occupational shortages. If the shortages themselves, however, are severe impediments to investment, then it may make some sense to incorporate them into the macro-forecasting models themselves. The necessity of doing this may be offset by the fact that good forecasts should generate supply responses that negate the forecast. That is, a good forecast that is accurate and used by the relevant parties may very well prove to be wrong *ex post* or after-the-fact since a good forecast should generate the responses that will make it wrong! Forecasts should not be judged on their *ex post* accuracy.

#### Canadian Occupational Projections System (COPS) and Job Futures:

In Canada, the Occupational Projection and Macroeconomic Studies unit of Human Resources Development Canada's (HRDC) Applied Research Branch is responsible for the production of COPS. HRDC has a number of provincial-level partners (typically ministries of education) who, in conjunction with regional HRDC offices, produce separate provincial projections.<sup>100</sup> Unlike the national model, provincial forecasts do not usually include forecasts of labour supply.

Most regions do not make readily available quantitative estimates of future labour market imbalances.<sup>101</sup> Instead, this information forms the basis of the qualitative predictions within the Job Futures (or similarly named) publications. In the national version, for example, an occupation's future rating is described as either "good", "fair", or "limited." The following outlines this rating process:

HRDC specialists begin with the rating of the current situation in order to assess labour market conditions for an occupational group in 2004. If, over the 1999 to 2004 period, the COPS economic models project significantly more new job openings, due to new job creation and retirements, than the number of new job seekers, i.e., new school leavers, immigrants and occupational re-entrants, then labour market conditions are expected to improve. This may lead to the current rating being adjusted up one level, e.g., fair to good.

Alternatively, a significant excess of the number of new job seekers relative to the number of new job openings may result in deteriorating

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<sup>100</sup> Provincial web pages can be accessed via <http://www11.hrdc-drhc.gc.ca/doc/jf/wow/en/appendix.shtml>,

<sup>101</sup> Exceptions are Saskatchewan and British Columbia, which do provide quantitative information on shortages.

labour market conditions. In this case, the rating may be adjusted down one level, e.g., fair to limited.

As was the case for the current rating, the future ratings for occupational groups may have been modified as the result of the 1999 consultations with industry associations, professional groups, unions and sector councils, as well as other qualitative information.<sup>102</sup>

In addition, other labour market information is used to determine the rating of "Good," "Fair", or "Limited". Compared to the top category of "Good," in the middle category of "Fair," jobs are more difficult to find, the probability of unemployment is higher, and wages and salaries are lower. The same applies when comparisons are made between the bottom category of "Limited" and the middle category of "Fair."

The current COPS model analyses information on 9,313 data series (67 industries decomposed into 139 occupations). Due to concerns about predicting so many series on the basis of the small size of the LFS (53,000 households), HRDC has proposed to reduce the level of disaggregation for analysing employment trends for the next COPS model. Specifically, they proposed to use 425 initial projections (17 industries and 25 occupational groups) to establish employment trends. These trends would then be extended to provide the occupational forecasts.

The qualitative projections, based in part on the COPs forecasts, are provided in publications such as *The Jobs Futures 2000*. These forecasts are provided along two dimensions: occupation and field of study.

The occupation dimension is based on 211 occupational groups from the National Occupational Classification (NOC). Of these, 137 are NOC minor three-digit occupational groups, while the other 74 are NOC four-digit unit groups. The 137 three-digit occupational groups cover all employment in Canada, except military occupations.

The level of occupational detail for the construction industry in the *Jobs Futures* report is (with the occupation code in parenthesis):

- equipment salespersons (622)
- helpers and labourers (761)
- managers (071, 0711)
- millwrights (731, 7311)
- trades workers (729)
- workers (721)

The field of study is based on the education and early work experiences of recent graduates from 155 major fields of study at four educational levels. The Field of Study

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<sup>102</sup> See: [http://www11.hrdc-drhc.gc.ca/jf-ea/jf1\\_understanding#HowRatings](http://www11.hrdc-drhc.gc.ca/jf-ea/jf1_understanding#HowRatings)

Classification (FOSC) is adapted from the Statistics Canada University Student Information System (USIS) and Community College Student Information System (CCSIS) which codes every program of study in Canada. The four educational levels with their number of fields of study are:

- university master's level, 34 fields
- university undergraduate level, 45 fields
- community college/Cégep level, 42 fields
- trade/vocational level, 34 fields.

For example, in the education level "trade/vocational" pertaining to Construction Technologies (T332), whose graduates usually "found work as carpenters in residential construction or in manufacturing doors and windows," the work prospects now, and in the year 2004 were described as in the lowest category of "limited", compared to "good" or "fair".

Currently, chances of these graduates finding work in occupations in which they usually look for work are rated "Limited", since recent unemployment rates and earnings in the intended occupations have been less favourable than those for the economy as a whole.

Over the next five years, this outlook is not expected to change, although the number of job openings available to newcomers is expected to slightly exceed the number of new job seekers. The competition among new graduates for jobs is expected to be above average.

These graduates are expected to have more success when searching for jobs as cabinetmakers or construction managers as opposed to carpenters in the furniture and wood products manufacturing sector. The better outlook for these particular occupations follows from the fact that they are concentrated in the construction sector of the economy, which is expected to grow strongly over the 1999-2004 period.<sup>103</sup>

#### Macro-econometric Forecasts:

National and provincial COPS models use the macro-econometric forecast supplied by the Ottawa-based consulting firm, Informetrica. At the national level, The Informetrica Model (TIM) integrates over 120 separate industries and over 300 final demand components (consumer demand, investment, government expenditure, inventories, imports and exports). It also has sub-models for demography (single-year age groups by sex) and energy demand. Reference forecasts are over a twenty-five year time horizon. The Provincial Forecast Service replicates the industrial detail of the National Forecast Service to the ten Canadian provinces and the Territories (aggregated).<sup>104</sup>

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<sup>103</sup> See <http://www11.hrdc-drhc.gc.ca/jobfutures/fos/T332.html>

<sup>104</sup> See <http://www.informetrica.com/prodserv/>



Starting with a national forecast, provincial forecasts are produced using Informetrica's Regional Industrial Model (RIM) which models the provincial economies in such a way that all PFS forecasts are consistent with those produced by the National Forecast Service. The RIM model provides forecasts of industry output and employment for each province and over 90 industries. In addition, forecasts include details such as: construction investment (structures and housing), machinery and equipment investment, key demographic measures, and provincial income measures such as personal and labour income, government transfer programs and corporate profits.

In Informetrica forecasts, construction output and employment are divided into the following structures: repair, residential, non-residential building, roads, highways, airstrips, oil and gas, dams and irrigation, railway and telegraph, other engineering, and other. These are frequently aggregated in Informetrica reports to three major structure types: residential and buildings, repair, and engineering.

In April 1996, Informetrica released "Planning for Uncertain Times: Canada's Economy and the Construction Industry." This special report on forecasts of investment demand in the construction industry contained two economic scenarios: orange (optimistic) and brown (pessimistic). The six factors identified as the driving forces behind changes in construction demand were (in order): interest rates; deficits and debt; infrastructure spending; resource developments; aging population; and business and consumer confidence. This report did not provide information on occupational shortages in the construction sectors, but it did provide background information that was used in a number of special studies of construction trades (e.g., boiler makers and millwrights, carpentry, electrical trades, iron workers, labourers, operating engineers, piping trades, and sheet metal workers and roofers). The report utilises Informetrica macroeconomic models of the national (TIM) and provincial economies (RIM). Its substantive content is updated and continuously evaluated by HRDC.

#### DALCOR Model and Construction Model<sup>105</sup>

The DALCOR model, developed in 1982, is a special model of the construction industry that was designed specifically to provide more detail of the occupational employment demand projections in that industry than is available from more aggregate forecasting models, like Informetrica. It utilises the investment demand projections developed by Informetrica based on scenarios developed by the COPS. In effect, it provides a detailed set of industry demand projections for different structures or subsectors of construction. It also provides the more detailed labour coefficients that translate spending by structure type into occupational

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<sup>105</sup> The DALCOR model is not publicly documented. The information provided here is based on discussions with Paul Stoll of Human Resources Development, as well as information he provided on the coefficients of labour requirements that translate employment demand by structure into occupational demand by structure.

requirements (by hours) by structure type within construction<sup>106</sup>. The hours of labour requirements were then converted to employment requirements through information on labour utilisation rates. The DALCOR model was expanded and enhanced in 1984, 1988/89 and 1995 and now serves as the basis of the Construction Model that provides forecasts for the Canadian Occupational Projection System when applied to construction.

In particular, the Construction Model specifies 29 structure types or sub-sectors within construction. These include:

Four Residential Building Structures:

- single detached
- semi-detached
- apartments and row housing
- other residential construction.

Eight Non-residential Building Structures Including:

- factories
- offices and hotels
- schools
- hospitals.

Seventeen Engineering Structures Including:

- roads, highways and runways
- sewage
- waterworks
- pipelines
- bridges.

The occupational labour requirements for these structures are based on the 7-digit CCDO code for 50 occupational groups. Examples include:

- construction labourer
- dry-wall finisher
- electrician
- mason
- insulation installer.

The labour requirement coefficients are essentially based on surveys of construction employers where they indicated the occupational requirements associated with employment in

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<sup>106</sup> Earlier information on labour requirements in construction was given in CMHC (1976, 1983).

typical projects in the different structures or subsectors of construction. In effect, they are coefficients that translate investment demand by structure into occupational demand by structure.

The investment demand used to generate the employment demand is based on *new* construction only and does not include installation of machinery and equipment or renovation and repair. The Construction Model itself does include labour requirement coefficients for the installation of machinery and equipment, as well as renovation and repair. However, these are based on historical relationships and are adjusted only on periodic and ad hoc bases if significant new information becomes available.

For new residential construction, the labour requirement coefficients were updated and expanded in 1995 based on a project carried out by the CHBA on behalf of CMHC and HRDC. The labour requirement coefficients were calculated for fourteen different residential housing types: singles under 160 sqm; singles over 160 sqm; semi-detached; row units; duplex units; triplex unit; 2 story; 3 story; 3 1/2 story, 4-6 story, 7-10 story, 11-16 story, 17-20 story, and 21+ story. Based on 64 seven-digit construction occupation groups and 10 provinces this led to 8,960 (14 x 64 x 10) cells of labour requirements in construction by housing structure, occupation and province. However, there were a large number of “empty cells” in some provinces because the detailed occupational labour requirements were not available for all provinces. As such, the labour requirement coefficients were consolidated into six housing categories:

- single-detached
- semi-detached
- row housing
- walk-up apartments
- mid rise apartments (4-10 story)
- high rise apartments (11+ story).

Clearly, the DALCOR and subsequent Construction Model have the potential to provide detailed information on the occupational labour demand requirements for the different subsectors of construction. They are also linked with the broader occupational forecasts for other sectors through the Informetrica model that provides occupational labour demand projections (along with some supply projections) that are used for labour forecasts in other industries and occupations in the COPS system.

However, these models face the difficult problem that labour requirements in the different structures are likely to change substantially over time. This highlights the importance of updated estimates of the coefficients – an onerous task since it is based on survey information from builders as well as other sources. It also highlights the difficulty of responding to such surveys since small employers especially may not know precisely the labour requirements associated with each of their different activities. This is especially the case since there is likely to be some substitutability of inputs as well as procedures, especially with subcontracting.

Furthermore, the DALCOR and subsequent Construction Model essentially model the

labour demand side of the picture. They do not formally consider the supply side of the construction sector which may be affected by such factors as retirements, training, immigration, migration, subcontracting, prefabrication, and “upskilling” or “downskilling”. Yet, these were the very factors contributing to shortages as discussed previously.

These issues are paramount in residential construction with their proliferation of small employers, subcontracting, less formal practices and underground economy. While it may be feasible for large employers to specify their typical labour requirements in non-residential projects like an office tower, or a pipeline or a kilometre of highway, this is not the case for a small contractor in residential construction. This is especially the case in renovation and repair where it would not be feasible to specify a “typical case.” Again, this arises because of the fundamental differences between residential and non-residential construction.

The omission of investment demand emanating from the installation of machinery and equipment and from renovation and repairs is acknowledged to be a serious omission for the construction sector. But it is obviously most serious for residential construction, given the importance of renovation and repair in that sector.

In residential construction there are also likely to be greater avenues for substitution of other types of labour or even other procedures for skills that are in short supply. As well, there will likely be more exiting from that sector to the extent that employees would be attracted by the higher paying jobs in the non-residential sector in time of labour shortage. This highlights the difficulties of predicting the net labour requirements in residential construction, again because of the fundamental differences between residential and non-residential construction.

Some trades in construction can be projected on the basis of overall estimates of construction spending. This is the case for the mechanical trades and the foundation trades. But demand for many other trades depends upon architectural specification and alternative building processes<sup>107</sup>. Examples of alternatives (with the different required trade indicated in parenthesis) include: framing of the house being brick (masons) or poured cement (concrete formers); exterior being finished (stucco plasterers) or unfinished; floors being wood (carpenters) or carpet on cement; and the interior finish being paint on drywall (economy finish) or finish coat of plaster on drywall (high-end finish). While these alternatives may give some flexibility for builders to respond to shortages, they make the forecasting of such shortages extremely problematic.

In such circumstances, it is not obvious that an updated and regionally expanded DALCOR-type model would be able to predict shortages in *residential* construction. Of course, it has to be compared to the alternatives, and there are no obvious better alternatives. In that vein, it may be akin to Churchill’s statement of Democracy as “the worst of all systems ... except for all of the others.”

Even if it is “asking too much” of an occupational projection model to accurately forecast

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<sup>107</sup> Personal communication with John O’Grady.

shortages in the residential component of construction, it is the case that the same information that is needed to facilitate such forecasts is useful in providing qualitative pictures of what is likely to happen in the sector. In essence, analysing the information that may make the forecasts in that sector less reliable is an inherently useful exercise in itself. In addition, the initial estimates can be the starting point for qualitative discussions of how they may be modified in light of all of the consideration of the various factors that call into question the forecasts in the first place. If there is agreement on the modifications that should be made, then they may be formally incorporated into the forecasts themselves.

The idea behind the DALCOR and the Construction Models seems sensible. That is, build on the proven strength of the Informetrica model that lies behind the COPS forecasts, by providing more detail of the labour demand requirements by subsector within construction, and link these to occupational demand forecasts through labour requirement coefficients provided by those closest to the industry – the builders themselves. Whether this can work for the *residential* subsector is, however, a more open question that merits further examination, especially in light of the alternatives – or absence of alternatives.

#### Summary and Concluding Observations on Forecasting Labour Shortages

- The lack of information on labour demand and supply for particular skills is a contributing factor lying behind most of the reasons for the *existence and persistence* of shortages. Providing such information is thereby a common ingredient of many of the *solutions* for alleviating shortages, and it certainly facilitates *adjusting* to them and hence mitigating their negative consequences. In essence, forecasting labour shortages is an essential step in deriving proactive solutions and reducing the adjustment consequences.
- Unfortunately, most of the existing data and models have severe limitations for predicting shortages in general, and in construction in particular, and especially residential construction. For example:
  - job vacancy data no longer exists
  - the Help Wanted Index is not disaggregated along industry lines
  - employer surveys of shortages or hiring intentions do not exist in construction, at least in a systematic fashion
  - tracking shortages through indirect evidence such as increases in wages or overtime or reductions in unemployment do not exist at the disaggregate level of residential construction by occupation
- Occupational projections (such as those provided by COPS based on forecasts from Informetrica supplemented by qualitative assessments from experts) are more useful.
- Their usefulness in the *construction sector in general* is enhanced by the greater detail and industry-specific information on labour requirements provided by the supplementary DALCOR model and its successor, the COPS Construction Model.

- However, their use in construction is severely hampered by such factors as:
  - They rely on employer surveys of labour requirements in typical projects in the different structures or subsectors, and these can be difficult to update and to get from smaller employers.
  - They do not directly incorporate the supply adjustment such as immigration, retirements, mobility, skill substitution, and apprenticeship completions that are important in construction.
  - The investment demand projections that lie behind the employment demand projections are based on new construction only and do not include the installation of machinery and equipment or renovation and repairs.
- These factors that severely limit the ability to predict shortages in the construction sector in general are even more applicable to residential construction and especially renovation and repairs. This is so because:
  - The proliferation of small employers, subcontracting, less formal practices and the underground economy, makes it extremely difficult for employers to provide information on labour requirements in that sector. Defining a typical project is next to impossible.
  - Shortages in the residential sector may be increased by mobility out of that sector and into the higher paying non-residential sector in times of shortages.
  - The more informal employment practices open up more substitution possibilities for dealing with shortages, again making it more difficult to forecast them.
  - The fact that the investment demand projections are for new construction only and do not include renovation and repairs is obviously a more severe omission in residential construction given the importance of renovation and repair in that sector.
  - Indirect skill substitutions are possible through different building processes enhancing the difficulty of forecasting shortages from construction spending estimates.
- In such circumstances, it is not clear that models like DALCOR or the COPS Construction Model, even if updated and regionally expanded, can capture the elusive labour requirements (and supply responses) of the *residential construction sector*, and especially renovation and repairs. This merits further investigation – especially in light of the absence of clear alternatives, and the fact that the process of improving forecasting capability in this area is likely to yield useful information by itself. At this stage, perhaps the safest conclusion is that the burden of proof should be placed on those who argue for such improved forecasting, to indicate that the benefits exceed the costs.
- Given the problems of conventional models for predicting labour shortages in *residential construction*, and especially in *renovation and repairs* consideration could be given to expanding the CHBA Pulse survey in various dimensions to provide more precise information on specific shortages. Possible dimensions include: delineating specific trades/occupation groups; additional disaggregation of specific cities; increasing the response rate; and exploring possible reasons for the shortages.

## 8. SUMMARY, POLICY IMPLICATIONS AND NEED FOR FURTHER RESEARCH

The analysis in this study highlighted a wide range of policy implications as well as needs for future research. They will be reiterated here to provide a self-contained set of policy issues and future research needs that should be addressed. Prior to those summaries, the basic background information that was presented will also be summarised. Since this is basically a “summary of the summaries” the qualifications and details provided in the text are necessarily omitted.

### Consequences of Labour Shortages in Construction

Labour shortages in construction can have a wide range of consequences given the inter-relatedness of the production process and the backward and forward linkages that are involved as well as the importance of the shelter industry to communities and families. These consequences include:

- *Structural bottlenecks* that inhibit hiring other workers who are complementary to those for whom a shortage prevails
- *Restricted output and delays* in completion, with complications arising because of expired permits etc.
- *Quality problems* if “corners are cut” and other less qualified workers or other inputs used
- *Hazards and health and safety problems* if job pressures increase and temporary workers unfamiliar with the industry are used
- *Wage cost escalation* to fill shortages with that escalation having possible spillover effects to other trades and workers, with temporary wage increases being difficult to roll back if the shortage dissipates
- *Delays and housing price increases*, both of which are costly to families
- *Shift to prefabrication, the underground economy or other processes* that are less reliant upon the skills in short supply, with that shift possibly becoming permanent leading to permanent displacement of skilled trades
- The uncertainty associated with shortages that can lead to cobweb type adjustments enhancing the negative image of the industry and leading to the need to pay costly *compensating wage premiums for that uncertainty and negative image*.

### Characteristics of Construction that Have Implications for Labour Shortages

- *Boom and bust cycles* with residential construction being sensitive to cyclical fluctuations, albeit with steady growth in residential construction over the 1980s and 1990s; when the economy is booming new housing and renovations also increase making it difficult to recruit

from other sectors that are also expanding.

- *Seasonal and weather patterns*, and while the seasons are obviously predictable, the weather patterns are not, again increasing uncertainty about employment stability in that sector
- *Mega-projects in non-residential construction* that can have spillover effects to residential construction by drying up large pools of otherwise available labour
- An industry that is *bifurcated* along various lines:
  - between *residential and non-residential* construction, with non-residential construction (the largest component) usually having the high-wage jobs that can draw workers from residential construction when there are shortages
  - between *new homebuilding and renovation and repair* (the later being largely non-unionised)
  - between *regions*, especially with Quebec where new homebuilding is heavily unionised and regulated with all trades being licensed
- In spite of this bifurcation, many workers *alternate employment* between residential and non-residential construction and between formal employment and the underground economy
- *Small and temporary worksites* in residential construction, with most employers (builders) being *small businesses* increasingly relying on self-employed independent contractors
- A wide range of links in the “employment” relationship with *the employee often being far removed from the builder* because of intermediate links with contractors and subcontractors
- In part because of this weak link, builders (who generally do not have extensive personnel and management skills) tend to think of *labour as a cost to be minimised rather than a resource to be strategically utilised* as a source of competitive advantage
- A substantial amount of “*underground*” employment in the residential construction sector especially since the introduction of the GST and recent increases in self-employment, with that underground employment often drawing off skilled workers that could otherwise work in the formal economy
- *Fierce competition* with low profit margins and a high rate of bankruptcy with the associated uncertainty that this creates and the difficulty of establishing long-term relationships between employee and employer
- *Employee identification with their craft* or trade more than with their employer (builder or homeowner)
- An industry that is *labour intensive*, especially in renovation and repair
- Requirements for employees in residential construction to have not only trade skills, but also *people skills* since they often deal directly with the customers who are increasingly sophisticated in their demands
- Increased competition from the “*do-it-yourself*” economy, with consumers often doing their own work, aided by large retailing centres like Home Depot, as well as TV repair shows
- An industry that is *subject to extensive regulations* in a variety of areas (permits, licensing, health and safety, workers’ compensation, labour standards, product liability and employer-employee relationships with independent operators with its associated tax implications)
- An incredible *array of work arrangements* including hourly pay, piece rates, subcontracting, and moonlighting as well as formal and informal arrangements.



## Related Pressures Suggesting a Long-Run Shortage Problem in Construction

Various pressures from both the demand and supply side of the market as well as from the institutions and laws that govern the employment relationship have both contributed to labour shortages in construction, and made it more difficult to alleviate those shortages. This suggests that the current shortage issue in construction is not simply a temporary problem. Rather, there is a growing long-run problem in the industry, superimposed upon any issues of short-run, temporary shortages. The industry has structural characteristics that are giving rise to more long-run shortages and that are making it difficult to use conventional mechanisms to alleviate shortages. This is occurring for various reasons:

- Residential construction *is sandwiched between non-residential construction and the growing underground economy*, both of which often provide more attractive employment opportunities, thereby contributing to shortages in residential construction and exacerbating shortages by luring employees during expansions.
- The *ageing workforce* in construction is entering the age of conventional retirement, and may be reluctant to work longer hours, increase the intensity of their work effort, adapt to technological change or undertake new training especially in new technologies.
- The workforce is in danger of not being renewed because of reluctance *on the part of youths* to enter the industry and because of difficulties in the training and apprenticeship system. As well the skilled trades cannot be filled by casual youth labour.
- The *male-dominated* nature of the industry means that it is less able to draw on females from the household to fill shortages.
- The *dominance of the two-earner family* means that it can be difficult to get the workforce to work longer hours since many may have family commitments. The additional income from the other family member working also means that the family members can afford not to work overtime or long hours.
- The increased *diversity in the workforce* can make it more difficult (and potentially hazardous) to deal with shortages if, for example, language and communication barriers make it more difficult to add a few more workers to a site that otherwise has a set of common language and communication skills.
- The *changes in immigration* involving a shift *in the country of origin of immigrants* away from traditional sources of construction labour, and the enhanced emphasis on refugees and family reunification as well as the re-orientation away from filling specific skill shortages, means that immigration may not be as important a potential source of labour supply to alleviate skill shortages.
- The *booming economies of Western Europe* have also reduced the traditional sources of skilled labour emanating from the earlier “push factors” when workers could not find jobs in their own economy.
- The *increased land and housing prices* in the booming construction areas are making it increasingly difficult for construction labour and material suppliers to locate near the construction worksites.
- The *non-tradable* nature of construction means that imports of products or services generally cannot be used to alleviate domestic shortages.

- While *technological change and the information economy* provide the potential to alleviate labour shortages in the long run, this is very difficult to infuse into the small, cash-strapped businesses of residential construction. Furthermore, these can create their own shortages of persons who can work with the new technology – a particular problem given the ageing construction workforce and the dearth of new young entrants and training opportunities.
- While *prefabrication* provides the potential to alleviate shortages, it also gives rise to a potential shortage of persons to install and maintain the prefabricated product.
- The increased emphasis on *reduced inventories and just-in-time delivery* of material suppliers can create material shortages in residential construction that can worsen labour supply issues, especially given the difficulty for small contractors to co-ordinate the skills and materials inputs (to the extent that they are affected by just-in-time delivery).
- The *severe recession of the early 1990s* led to reduced construction, reducing the skill base and creating a pent-up demand, both of which enhanced shortages in the late 1990s.
- The *increasing pressure on governments* to reduce expenditures and decentralise many of their functions (e.g., reduced EI and devolving training delivery and apprenticeships to the provinces) has made it more difficult for them to assist in alleviating shortages.
- These longer run structural trends are likely to continue into the future, and some, like the ageing workforce, are likely to increase dramatically. This highlights that the underlying forces are such that *the problem of shortages in construction are not just temporary*, and are likely to increase in the future. Structural problems require structural solutions.

#### Reasons for the Occurrence and Persistence of Labour Shortages

A wide range of reasons for the occurrence and persistence of labour shortages were documented. Some are likely to be only short run, but as discussed previously, the ability of the construction labour market to deal with even temporary shortages is under strain. Reasons for the occurrence and persistence of labour shortages included:

- Short run and cyclical demand changes including those associated with mega-projects that can have spillover effects on residential construction
- Seasonal and weather related factors, and while the seasonal factors are predictable, the weather related ones are not so predictable – they also make the industry a less attractive place to work
- Cobweb type adjustment models resulting from the uncertainty, time lags and adjustments in the system, which again can make the industry a less attractive place to work and give rise to a reluctance to adjust to the shortages in case they disappear or even turn to surpluses
- Barriers that inhibit workers from financing the human capital investment (training, mobility information) to acquiring the skills that are in short supply, arising in part from an inability to use their human capital as collateral to finance the investment
- A reluctance on the part of employers to pay for the skill acquisition (e.g., to provide the training) because they may lose their investment to firms that do not train but simply “poach” the trained worker
- An inability of wages to rise to clear the shortages in parts of construction because of

rigidities in wage structures due to such factors as collective agreements, apprenticeship wage ratios and norms as to what are appropriate wage relativities, as well as the difficulties for employers in the residential sector to compete for employees with the higher-wage (often unionised) non-residential sector.

- A reluctance on the part of employers to raise wages to attract in new employees to fill shortages because they will also have to raise the wages of their existing workforce to maintain internal equity (termed monopsony)
- Narrow job classifications and single-skilled training that inhibit existing workers from doing some of the work to fill the shortage
- Mandatory licensing and certification, often fostered by preferential hiring practices, that can inhibit the use of substitute labour, including labour from other regions, to fill the shortage
- Rigidities in the apprenticeship system associated with such factors as the ratio of apprentices to journeypersons (as well as their wages), long lags, narrow craft jurisdictional lines, and lack of recognition of graduated skills acquisition at different phases of the apprenticeship.
- A bias against vocational education in general and a negative image of construction in particular in part because of an association with “brawn not brains”
- A lack of training culture on the part of employers reflecting various factors: the poaching problem; the past reliance on immigration; the difficulty of developing a coherent strategy amongst in a bifurcated industry with many small employers; and the poor links between labour market needs and the education system
- Lack of an effective training system, for many of the same reasons, and also because of an earlier government emphasis on passive income maintenance programs (like unemployment insurance) that encourages people to stay in declining sectors and regions, as opposed to an emphasis on active adjustment assistance (training, mobility, information) that encourages people to move from surplus jobs to shortages
- Slow responses of training institutions given the various lags in the system, including the lags of forecasting the supply and demand changes that give rise to shortages
- A failure to develop indigenous responses to shortages because of a past reliance on immigration – a source that has now dried up
- Restrictions on long hours of work and overtime to reduce shortages, although this likely comes more from collective agreements (in non-residential construction) and from a reluctance on the part of an aging workforce and the increased number of two-earner families to work the long hours, than it comes from government employment standards
- Difficulties of eliciting additional effort on the part of existing employees to close the shortage because they are already likely “maxed out” with any further pressure jeopardising moral, quality or safety
- Difficulties of expanding work hours because of natural limits to the “working day” in construction, associated with such factors as daylight, municipal regulations and the presence of families in renovation and repair
- Difficulties of substituting other inputs for the skills in short supply, for various reasons:
  - Union work rules (if unions are present) or licensing and apprenticeship requirements
  - Substituting different processes (e.g., prefabrication of components and final products) is likely to occur only in the very long run
  - Temporary help agencies are geared more for filling a specific short-run need in a

- particular organisation and not a general labour shortage
- Subcontractors also become scarce in times of a general skill shortage
- The use of self-employed independent contractors can be inhibited by the uncertainty as to whether they will be deemed to be employees for tax purposes, and this can lead to contractors “churning” through different independent contractors rather than trying to establish longer run relationships, because the longer run relationships could be deemed to be an employment relationship and hence subject to those taxes and regulations
- For reasons elaborated upon in the study, residential construction does not appear to have undergone the productivity enhancing technological change and transformed business and strategic human resource practices that have occurred in other industries
- Expanded underground economy that provides an alternative source of employment for workers who could otherwise close the skill shortages, albeit the underground economy can obviously be an alternative way of getting the work done if it cannot be done because of skill shortages in the formal economy
- Strikes and labour disputes that “close down” particular trades and inhibit other groups from working to close the shortages
- Absence of co-ordinating mechanisms that can facilitate the reallocation of surplus labour to labour shortages, in part because of the fragmented and bifurcated nature of the industry with its proliferation of small businesses that tend to think of labour as a cost to be minimised rather than a resource to be fully utilised

#### Implications for Responses from Stakeholders

The previously discussed reasons for the occurrence and persistence of labour shortages highlighted the need for responses from the various stakeholders so as to proactively prevent shortages from arising in the first place, and adjusting to them if they do arise. If the responsibility for the response lies with a particular stakeholder, that is so indicated and highlighted in *italics*. Elements of those responses included:

- *Governments* managing the demand fluctuations through conventional macroeconomic policies, but also by bringing non-residential mega-projects on stream in a countercyclical fashion wherever possible
- Allowing more flexibility in the apprenticeship system through various ways:
  - expanding the off-the-job component in times of surplus and expanding the on-the-job component in times of shortage
  - More flexibility in the regulations on ratios of apprenticeships to journeypersons and their wages
  - Reducing mandatory licensing regulations in skilled trades and restricting them to situations where the customer and public interest cannot be adequately protected by inspections and the reputation of contractors or by the use of the less restrictive voluntary certifications
  - Public representation on self-governing licensing bodies to ensure that the public interest is represented, including the interest to alleviate shortages.

- The flexible application of mandatory licensing where it is warranted, so as to minimise the risk of the completely unregulated alternative
- Relaxing the narrow craft jurisdictional lines and encouraging broader based multi-skilling to go with the multi-tasking
- Sector-based apprenticeships including ones in residential construction as one means to provide this broad based training relevant to a wide range of tasks in the industry
- Certification of different components of graduated skills and prior learning acquired at different phases of the apprenticeship
- Maintenance of a permanent data base on such graduated acquired skills and their upgrading
- Expansion of initiatives like the Red Seal program and the 1994 Agreement on Internal Trade which encourage mutual recognition and mobility
- *Governments* providing financial support for vocational education that is on par with that for more academic education
- *Governments* consider the provision of micro-finance loans for self-employed construction entrepreneurs
- *Employers* expanding the efforts to tap into youths, women and Aboriginal persons as an important source of renewal
- *Employers (and unions where present)* reducing the narrow job classifications that may exist in collective agreements and personnel policies so as to encourage multi-tasking to do a wider range of tasks
- Multi-skilling and broad based training to enable workers to do the wider range of tasks
- Quick speciality training programs (e.g., like in residential home building) that can meet specific shortages but also serve as modular building blocks for subsequent broader-based multi-skilled training and life-long learning
- Using new technology such as the internet and self-paced computer programs to speed up training, facilitate upgrading and safety information, and to introduce trainees to the new information technology as well as new product information
- More accurate forecasting of the demand changes and the potential supply responses
- *Governments* considering the possibility of short-term work permits for immigrants to fill specific skill shortages in construction, and the possibility of particular industries in particular provinces being able to sponsor particular immigrant groups to fill shortages
- Enhanced efforts on the part of *employers and governments* to recognise foreign credentials, equivalency standards and prior learning.
- Encourage the use of time off in lieu of overtime premiums where collective agreements exist, if it is of mutual benefit to both parties
- *Employers* should think of labour not as a cost to be minimised, but as a resource to be utilised so as to ensure a high-commitment workforce to enhance the possibility of expanding the effort margin to alleviate shortages.
- Clamping down on the underground economy and informing customers of the risks of using the underground economy, but also reducing the excessive regulations that may have fostered its rise, and considering what lessons may be learned from the underground economy
- Devising methods to deal with strikes and labour disputes, but recognising that the prevention of labour shortages should not be the prime motivating factor in this area, and that

such disputes arise for complicated reasons

- Fostering joint *labour-management* initiatives, including training, to alleviate shortages
- Determining the need for more formal Sector-like Councils in construction, albeit such support obviously has to come from the parties themselves
- Encouraging and enhancing internet and computer based data banks (such as the Electronic Labour Exchange) on the availability of skilled workers and subcontractors (supply) as well as on available jobs (demand), to be used both as a job matching tool to fill shortages and to possibly forecast shortages.

### Lessons from Other Areas Subject to Shortages

Other groups, such as information technologists, tool and die makers, nurses and doctors have experienced skill shortages. Lessons to be learned from those groups include:

- *Shortages can arise and persist for a wide range of reasons* and while restrictions on labour supply responses typically contribute to the shortages, such restrictions are not always present, as is the case with the IT sector where artificial barriers are not prominent.
- *Immigration is often regarded as a potential solution* although there is concern that this may inhibit the development of indigenous supply responses, including the development of internal training systems. Enhanced immigration highlights the needs for better procedures to recognise foreign qualifications, where such qualifications are an issue.
- More flexibility and *involvement of employers in the immigration of temporary workers* is also often advocated.
- Increased *professionalisation is generally not regarded as a solution* to shortages in these other areas in part because the associated jurisdictional boundaries, barriers to entry, regulations, (often) narrow job classifications, and lengthy training requirements, are often regarded as contributing to the problem. (Whether professionalisation is part of the problem or part of the solution, however, merits more scrutiny).
- *The substitution of less (formally) skilled personnel*, or personnel with related training, can be an important source of filling labour shortages, as can technology in certain circumstances.
- *The private parties will often respond in various imaginative and creative ways* to deal with shortages, although some of them may have negative implications for domestic employment (e.g., offshore outsourcing) and others such as internal training may be inhibited by the poaching problem.
- *Some private responses may be short-run solutions that could worsen the shortages* in the long run. This can occur, for example, if an overheated market draws people out of the education and training programs that are otherwise important sources of skilled labour supply.
- *Regulations that inhibit market forces from operating can certainly contribute to shortages*, although the regulations obviously may serve other social purposes. Those other social purposes, however, should be assessed in light of the negative consequences that result from the critical skill shortages that result.
- While some attention is sometimes paid to the possibility of *reallocating labour from surplus*

*to shortage areas*, this may be an opportunity that is not fully exploited especially given the twin benefits of alleviating shortages and unemployment or underemployment.

- Unfortunately, *many of procedures that the other sectors have used to deal with shortages are not readily available in the construction sector* and especially residential construction, given their unique characteristics. This is the case, for example, with respect to such procedures as: work study programs (outside of apprenticeships); internships; stock options; non-wage benefits such as flexitime or childcare and fitness programs at the workplace; in-house training; and increased use of groups such as disabled persons.
- *Being high profile* helps since many of these other areas where shortages are occurring (e.g., IT workers, doctors, nurses) are on the “radar screen” of both the general public and of governments. The construction industry may not be on that radar screen and hence not as amenable to initiatives involving such factors as improved data and labour market information, assistance to deal with the shortage, and more flexibility in the application of regulations.
- *Improved data and labour market information* on demand and supply in these areas as well as on-going labour market analysis are generally regarded as key ingredients for determining shortages, and for adjusting to them and perhaps pre-empting their occurrence.

#### Forecasting Demand and Supply and Labour Shortages

The lack of information on labour demand and supply for particular skills was a contributing factor lying behind most of the reasons for the *existence and persistence* of shortages. Providing such information is thereby a common ingredient of many of the *solutions* for alleviating shortages, and it certainly facilitates *adjusting* to them and hence mitigating their negative consequences. In essence, forecasting labour shortages is an essential step in deriving proactive solutions and reducing the adjustment consequences.

- Unfortunately, most of the existing data and models have severe limitations for predicting shortages in general, and in construction in particular, and especially residential construction. For example:
  - job vacancy data no longer exists
  - the Help Wanted Index is not disaggregated along industry lines
  - employer surveys of shortages or hiring intentions do not exist in construction, at least in a systematic fashion
  - tracking shortages through indirect evidence such as increases in wages or overtime or reductions in unemployment do not exist at the disaggregate level of residential construction by occupation
- Occupational projections such as those provided by COPS based on forecasts from Informetrica supplemented by qualitative assessments from experts are more useful.
- Their usefulness in the *construction sector in general* is enhanced by the greater detail and industry-specific information on labour requirements provided by the supplementary

DALCOR model and its successor, the COPS Construction Model.

- However, their use in construction is severely hampered by such factors as:
  - They rely on employer surveys of labour requirements in typical projects in the different structures or subsectors, and these can be difficult to update and to get from smaller employers.
  - They do not directly incorporate the supply adjustment such as immigration, retirements, mobility, skill substitution, and apprenticeship completions that are so important in construction.
  - The investment demand projections that lie behind the employment demand projections are based on new construction only and do not include the installation of machinery and equipment or renovation and repairs.
- These factors that severely limit the ability to predict shortages in the construction sector in general are even more applicable to residential construction and especially renovation and repairs. This is so because:
  - The proliferation of small employers, subcontracting, less formal practices and the underground economy, makes it extremely difficult for employers to provide information on labour requirements in that sector. Defining a typical project is next to impossible.
  - Shortages in the residential sector may be enhanced by mobility out of that sector and into the higher paying non-residential sector in times of shortages.
  - The more informal employment practices, and the possibility of using different construction processes involving different skills, open up more substitution possibilities for dealing with shortages, again making it more difficult to forecast them.
  - The fact that the investment demand projections are for new construction only and do not include renovation and repairs is obviously a more severe omission in residential construction given the importance of renovation and repair in that sector.
- In such circumstances, it is not clear that models like DALCOR or the COPS Construction Model, even if updated and regionally expanded, can capture the elusive labour requirements (and supply responses) of the *residential construction sector*, and especially renovation and repairs. This merits further investigation – especially in light of the absence of clear alternatives, and the fact that the process of improving forecasting capability in this area is likely to yield useful information by itself.
- Given the problems of conventional models for predicting labour shortages in *residential* construction, and especially in *renovation and repairs* consideration could be given to expanding the CHBA Pulse survey in various dimensions to provide more precise information on specific shortages. Possible dimensions include: delineating specific trades/occupation groups; additional disaggregation of specific cities; increasing the response rate; and exploring possible reasons for the shortages.



## Responses to Questions Raised in the Introduction

In the introduction, questions of policy and practical importance were raised to motivate the analysis. Responses to these questions are given in the section of the text indicated in parenthesis after the question. For further detail and appropriate qualifications those sections, or their summaries, should be consulted. The responses are reiterated here in a summary fashion to link them directly with those questions. Since this is largely repetitious with the existing summary, this section can be omitted or consulted simply to provide the more direct link with the questions that were raised.

- *Are skill shortages simply a natural feature associated with the unusual characteristics of this industry? Are they temporary, reflecting unusual characteristics at particular times and places, or are they likely to be a more permanent, structural feature of this industry?* [Part 2, Section on Implications of Related Pressures].

Shortages are a natural feature of residential construction and are often temporary, associated with such factors as boom and bust cycles, seasonal and weather patterns and spillovers from shortages in non-residential construction. As well, the ability of builders in residential construction to deal with skill shortages has always been hampered by a number of factors including the difficulty of competing with non-residential contractors, their small size and fierce competition which inhibits them from keeping a reserve of labour, their reluctance to raise wages to attract new recruits because of what this may do to their existing wage structure, and the difficulty of finding substitutes for skilled labour in short supply.

While these issues have long characterised residential construction, there are a number of reasons to suggest that the issue of skill shortages are becoming a more permanent, structural feature of that industry and that the problem may persist into the future. Reasons for this include: an aging workforce that is retiring and perhaps reluctant to work long hours or adapt to technological change or undertake retraining; difficulties in attracting youths and women into the industry; and a drying up of immigration as a source of skilled construction labour.

- *Why do such shortages arise, and more importantly, why do they persist?* [Part 3]

Skill shortages in residential construction arise and persist for a wide range of reasons, and, as indicated, while some may be short-run and temporary, the ability of the construction labour market to deal with these is under strain. Main reasons for shortages include: short-run and cyclical demand changes; seasonal and weather patterns; cobweb adjustments from uncertainties and time lags; barriers that inhibit workers from financing training and mobility; a reluctance on the part of employers to pay for training because of poaching; difficulties in using wages to clear shortages because of rigidities due to collective agreements, apprenticeship wage ratios, wage norms, and a reluctance to raise wage because of what it will do to existing wage

structures; narrow job classifications and single-skilled training; mandatory licensing; rigidities in the apprenticeship system; biases against vocational education and lack of a training culture and responsive training system; difficulties of substituting other inputs for skills in short supply; a drain of skilled workers into the underground economy; labour disputes; and the relative absence of co-ordinating mechanisms to facilitate the reallocation of labour from areas of surplus to areas of shortage.

- *What are the consequences of shortages for costs, quality, delivery time and the employment of related workers in the industry, as well as for the economy as a whole?* [Part 5]

Consequences include: bottlenecks that inhibit the hiring of complementary workers and lead to possible wage cost escalation; restricted output and delays leading to possible higher prices or quality problems; health and safety hazards; and shifts to the underground economy and possibly to prefabrication substitutes.

- *What information can be gleaned from other areas where shortages have been a key issue such as with nurses, doctors, tool- and-die makers and information technologists?* [Part 6]

Lessons include: there is no single “cause” of shortages; immigration is often a potential solution especially when it can involve employers and temporary work arrangements; increased professionalism with its regulations likely contributes more to the problem than to the solution; substitutes for the skilled labour in short supply are often possible in subtle fashions although some could increase the shortages in the longer run; regulations that inhibit market forces can contribute to the shortage; insufficient attention is likely paid to the possibility of reallocating labour from surplus to shortage areas; many of the procedures available to deal with shortages in these other areas are not readily available in construction; being high profile and on the radar screen of governments help; and improved data and labour market information is generally regarded as key.

- *What different types of labour market models can shed light on this issue, especially in terms of explaining labour supply and demand in this sector?* [Part 7]. *What information and databases are required to monitor construction labour supply and demand, with a view towards predicting, and more importantly, alleviating and adjusting to future shortages?* [Part 8, Section on Forecasting Demand and Supply and Labour Shortages]

Unfortunately, most of the existing data and models (detailed in the text) have severe limitations for predicting labour shortages, especially in residential construction. The best models are DALCOR and its successor, the COPS Construction Model, but even these have severe limitations. Any decision to update and regional expand these models should be based on a cost-benefit evaluation since it is not clear that they can capture the elusive labour requirements and supply responses of the *residential* construction sector and especially

*renovation and repair.* As such, consideration should be given to expanding the CHBA Pulse survey in various dimensions to provide more precise information on specific shortages. Possible dimensions include: delineating specific trades/occupation groups; additional disaggregation of specific cities; increasing the response rate; and exploring possible reasons for the shortages.

- *What is the appropriate policy response from the various stakeholders – employers and their associations; employees and their unions if present; and governments?* [Part 8, Section on Implications for Stakeholders].

For *governments* the main responses include:

- managing the demand fluctuations through conventional macroeconomic policies, but also by bringing non-residential mega-projects on stream in a counter-cyclical fashion
- providing financial support for vocational education that is on par with that for more academic education
- considering micro-finance loans for self-employed construction entrepreneurs
- considering short-term work permits for immigrants to fill specific skill shortages in construction, and the possibility of particular industries in particular provinces being able to sponsor particular immigrant groups to fill shortages

For *employers* (and sometimes governments and unions where appropriate) the main responses include:

- Expanding the efforts to tap into youths, women and Aboriginal persons
- Reducing the narrow job classifications that may exist in collective agreements and personnel policies so as to encourage multi-tasking to do a wider range of tasks
- Recognising foreign credentials, equivalency standards and prior learning.
- Regarding labour not always as a cost to be minimised, but as a resource to be utilised so as to ensure a high-commitment workforce to enhance the possibility of expanding the effort margin to alleviate shortages.
- Fostering labour-management initiatives, including training, to alleviate shortages

For *all parties* relevant responses include:

- Allowing more flexibility in the apprenticeship system through various ways:
  - Expanding the off-the-job component in times of surplus and expanding the on-the-job component in times of shortage
  - Increasing flexibility in the regulations on ratios of apprenticeships to journeypersons and their wages
  - Reducing mandatory licensing regulations in skilled trades and restricting them to situations where the customer and public interest cannot be adequately protected
  - Public representation on self-governing licensing bodies to ensure that the public interest is represented, including the interest to alleviate shortages
  - The flexible application of mandatory licensing where it is warranted, so as to

- minimise the risk of the completely unregulated alternative
- Relaxing the narrow craft jurisdictional lines and encouraging broader based multi-skilling to go with the multi-tasking
- Sector-based apprenticeships including ones in residential construction to provide the broad based training relevant to a wide range of tasks in the industry
- Certification of different components of graduated skills and prior learning acquired at different phases of the apprenticeship
- Maintenance of a permanent data base on such graduated acquired skills and their upgrading
- Expansion of initiatives like the Red Seal program and the 1994 Agreement on Internal Trade which encourage mutual recognition and mobility
- Multi-skilling and broad based training to enable workers to do a wider range of tasks
- Quick specialty training programs to meet specific shortages but also to serve as modular building blocks for subsequent broader-based multi-skilled training and life-long learning
- Using new technology such as the internet and self-paced computer programs to speed up training, facilitate upgrading and safety information, and to introduce trainees to the new information technology as well as new product information
- More accurate forecasting of the demand changes and the potential supply responses
- Encourage the use of time off in lieu of overtime premiums where collective agreements exist, if it is of mutual benefit to both parties
- Clamping down on the underground economy and informing customers of the risks of using the underground economy, but also reducing the excessive regulations that may have fostered its rise, and considering what lessons may be learned from the underground economy
- Devising methods to deal with strikes and labour disputes, but recognising that the prevention of labour shortages should not be the prime motivating factor in this area
- Determining the need for more formal Sector-like Councils in construction
- Encouraging and enhancing internet and computer based data banks (such as the Electronic Labour Exchange) on the availability of skilled workers and subcontractors (supply) as well as on available jobs (demand), to be used both as a job matching tool to fill shortages and to possibly forecast shortages.

#### Areas in Need of Further Research

Throughout the analysis, a number of areas in need of further research and information were highlighted. It is extremely difficult to prioritise these areas, and any attempt to do so is likely to be controversial. Subject to that caveat, they are listed here in rough descending order of priority, from least to most important. The priorities are:

- Determining the importance of the changes in the Employment Insurance system on residential construction

- Determining the extent to which skilled workers in residential construction move to the generally higher paying jobs in non-residential construction (or in other hot markets in the local economy) in times of shortage, thereby increasing the shortages in residential construction
- Determining the extent to which the shortage problem in residential construction arises in large part because of the difficulty of small residential builders finding qualified personnel willing to work below the higher (often unionised) wages paid in non-residential construction and by larger residential builders
- Determining the extent of the poaching problem, the extent to which it inhibits employers from providing training, and the ways of dealing with it (perhaps through an expanded Pulse Survey)
- Determining the extent to which subtle alternatives (e.g., prefabricated components, Home-Depot type do-it-yourself alternatives) can and will be substitutes for skilled construction labour that is in short supply
- Determining the costs and benefits of obtaining the technical labour coefficients in residential construction to provide information on labour requirements for using the Construction Model in residential construction
- Determining the need for and desirability of Sector-like Councils for construction, and the need for a separate council for residential and non-residential construction
- Determining the pros and cons of expanding temporary immigration as a solution to skill shortages in residential construction
- Determining the feasibility of modular training components in residential construction that can be certified with the potential for continuous upgrading and recognition of prior learning and graduated skills development and packaged in a “lego-type” fashion to meet the ever changing needs of that industry
- Determining the feasibility of a data bank that records and updates in a consistent fashion the information on those certified training and experience components, along with the information on graduated acquired skills and upgrading as discussed above
- Determining the pros and cons of building on the internet based Electronic Labour Exchange (ELE) to enhance its capabilities as a “one-stop, single-wicket” for job matching in residential construction, especially given the network externalities that are present such that its usefulness is enhanced by additional users on both the demand side (employers) and the supply side (employees), and determining the pros and cons of requiring EI recipients to be listed on the ELE
- Determining the extent to which a more extensively used internet job matching procedure could also serve as a mechanism for forecasting impending labour shortage, especially since such a procedure has the potential to indicate exactly which components of the job requirements on the demand side and worker qualification on the supply side are mismatched (e.g., is the mismatch due to skills mismatching and if so, which ones, or is it due to location differences?)
- Extending the analysis of the internet as a job matching procedure in general to the construction industry in particular, and especially residential construction, to determine its potential and any barriers that inhibit its potential
- Determining the feasibility and desirability of building on the CHBA Pulse Survey as a

vehicle for more consistently estimating residential construction labour shortages, and probing into their causes and consequences

- More rigorously estimating the effect of shortages on construction delays and housing prices in residential construction, for example, by measuring the effect of delays on housing prices using the CMHC data as discussed previously
- Estimating the effect of shortages on aggregate measures of the macro-economy, such as inflation, unemployment, interest rates and wages, through macro forecasting models that incorporate how shortages may affect features of the model such as productivity, employment and wages
- Determining the feasibility of reforms in the apprenticeship system especially to enhance flexibility through such procedures as: relaxing the narrow craft jurisdictional lines and encouraging broader based multi-skilling; instituting a residential construction apprenticeship to provide broad based training relevant to a wide range of tasks in the industry; certification of different components of graduated skills and prior learning acquired at different phases of the apprenticeship; and maintenance of a permanent data base on such graduated acquired skills and their upgrading
- Determining the reasons for the high drop out rate from apprenticeships and how that changes over time, over business cycles and across different trades
- Outlining the elements of a human resource strategy for the residential construction industry, taking account of its unique characteristics and needs. This is especially important since the tools available to the industry to help manage labour supply and demand currently appear to be lacking. The desired elements of a human resource strategy for any industry can be first laid out, and then their applicability to construction determined so that they could be modified to take account of the unique circumstances of that industry. Elements of that human resource strategy could include: the importance of linking the human resource strategy to the business strategy; the pros and cons of increased professionalisation; the importance of a proactive rather than reactive strategy; and the importance of the strategic involvement of all stakeholders. Such a proactive human resource strategy could go a long way in dealing not only with the fundamental issue analysed in this study – skill shortages in residential construction – but also in providing the bases for dealing with the emerging issues associated with the new world of work, and how they apply to residential construction.

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