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**The Construction Sector in the People's  
Republic of China**  
**Policy Analysis on sectoral development and  
employment challenges**

**Qian Xiaoying, Zhao Hui**



**Employment-Intensive Investment Branch**

**International Labour Office, Geneva**



# **The Construction Sector in the People's Republic of China**

## **Policy analysis on sectoral development and employment challenges**

**June, 2004**

**Employment-Intensive Investment Branch  
International Labour Office, Geneva**

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## PREFACE

Job creation is at the top of the agenda for governments worldwide, and China is no exception as it works to stem the threat of growing unemployment.

Although the Government of China has been working hard to generate employment through employment and re-employment programmes across the country, it continues to act as a bottleneck in the country's development as a result of a large number of new entrants to the labour market, the migration of surplus rural labour, as well as layoffs in state-owned enterprises undergoing reform and restructuring.

While the study shows that the construction sector has been vital in absorbing a large chunk of rural labour, particularly during the 1980s and early 1990s, recent developments, including restructuring and greater mechanization and industrialization have seen job growth for rural labour easing.

One of the author's main recommendations is that more labour-based techniques should be utilized in China to try and generate more employment opportunities and counter the potential negative effects posed by a shift towards using pre-mixed concrete and pre-fabricated fittings.

The ILO's Employment-Intensive Investment Programme (EIIP) has proven that a labour-based development strategy not only shows the advantage of higher labour inputs, but also reduces costs, and hence is more productive when considering all production factors such as capital, unskilled workers etc. Therefore, the authors conclude that a more balanced policy has to take into account both economic, technical and social aspects of development, particularly in the countries that have a surplus of labour.

The study marks a new era for the ILO and its constituents in working to influence policies at an upstream level. We hope the conclusions, findings and recommendations can help policy makers develop employment-led investment policies, strategies and programmes, and further contribute to a shift from purely growth-centred strategies towards more employment-intensive development patterns.

Geneva, June 2004

Jean Majeres  
Chief  
Employment-Intensive Investment Branch

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## TABLE OF CONTENTS

### Preface

### Acknowledgements

<b>1.</b>	<b>The current features, issues and status relating to labour and employment in China's construction industry .....</b>	<b>1</b>
1.1	The general employment situation and key relevant policies in China .....	1
1.2	The important role played by the construction industry in the Chinese economy .....	2
1.3	The construction industry's ability to employ huge numbers of unemployed rural labour .....	3
1.4	Stagnant growth in job opportunities in the construction sector .....	4
1.5	Reasons for the stagnation in employment growth in the construction sector.....	5
<b>2.</b>	<b>A review and analysis on industrial and employment policies in China's construction industry .....</b>	<b>10</b>
2.1	The impact of industrial restructuring and reform of state-owned enterprises in the construction sector .....	10
2.2	Adjustments to the system of recruitment, and the establishment of the labour supply base .....	13
2.3	Policies regarding mechanization and industrialization .....	15
2.4	A new policy on interior fittings .....	17
<b>3.</b>	<b>Case studies examining a General Construction Contractor (A), (B), and an interior fitting a Labour Supply Subcontractor company (C) .....</b>	<b>18</b>
3.1	Background regarding situational analysis .....	18
3.2	The effect on employment in a state-owned company (1985-2002) .....	18
3.3	The effect on employment in the sphere of labour subcontracting .....	19
3.4	Case shows effects of mechanization on employment may be limited .....	20
3.5	Impact of using pre-mixed concrete on employment .....	21
3.6	Impact of using pre-fabricated interior fittings on employment .....	22
3.7	Other factors making an impact on employment .....	23
<b>4.</b>	<b>Developments and forecasts on China's construction sector .....</b>	<b>25</b>
<b>5.</b>	<b>Conclusions and recommendations .....</b>	<b>30</b>
5.1	Results and analysis .....	30
5.2	Evaluations and issues regarding industrial policy .....	31
5.3	Implications to the Future Policies .....	32

## **Chapter 1**

### **Current features, issues and status relating to labour and employment in China's construction industry**

#### ***1.1 The general employment situation and key relevant policies in China***

- 1.2 The important role played by the construction industry in the Chinese economy
- 1.3 The construction industry's ability to absorb huge numbers of unemployed rural labour
- 1.4 Stagnant growth in job opportunities in the construction sector
- 1.5 Reasons for stagnation in employment growth in the construction sector

#### ***1.1 The general employment situation and key relevant policies in China***

Since China adopted its open-door policy, rapid economic development has created a huge number of jobs. By 2002, the labour force had reached 730 million compared with 420 million in 1980. Of the total, 480 million are located in rural areas, with the remainder based in towns and cities. Tertiary and secondary industries employed 370 million workers as of 2002, up from 130 million in 1980. These industries provide employment for a large number of rural workers, many of whom migrate to major Chinese cities with the aim of escaping poverty and gaining a regular income.

China's huge population base and streams of new workers means that there is constant pressure on employment. It is estimated that 150 million men and women are underemployed, while unemployment in cities has been growing since the late 1990s when reforms on State-owned enterprises began along with adjustments in the industrial sector. In towns and cities, some 10 million new workers enter the labour market per annum. By the end of 2002, it was estimated that unemployment had reached 11.7 million, representing four per cent of the population, compared with 3.1 per cent in 2000. In this respect, the employment situation in China is of great concern.

The Central Committee of the CPC and the State Council organized a national working meeting in Beijing in September 2002 to seek to generate solutions to the employment situation. Then president of the People's Republic of China Jiang Zemin pointed out that the following five points need to be examined and addressed in order to improve the employment situation.

- The relationship between the development of the economy and the creation of more jobs
- The relationship between the adjustment of the economic structure and the creation of more jobs
- The relationship between further reform and the creation of more jobs
- The relationship between joint economic development in cities and rural areas and the creation of more job opportunities
- The relationship between an improvement in the social security system and the creation of more jobs

This demonstrates that central government is paying close attention to the employment situation, and is beginning to raise the issue as a vital element in economic development.

This report primarily focuses on analysis of construction enterprises and examines areas related to the five points listed above.

Firstly, we must acknowledge that the construction industry one of the key sectors in supporting economic development in China. The construction sector is closely related to the adjustment in of the economic structure in China. It is a labour-intensive industry where different kinds of enterprise co-exist.

China’s construction enterprises required restructuring. While many construction enterprises are small- and medium enterprises (SMEs), the larger-scale enterprises tend to be State-owned companies. The task to reform these enterprises is enormously challenging. The construction sector is one of the most important parts of China’s economy, since it absorbs the largest number of workers among all the country’s industries.

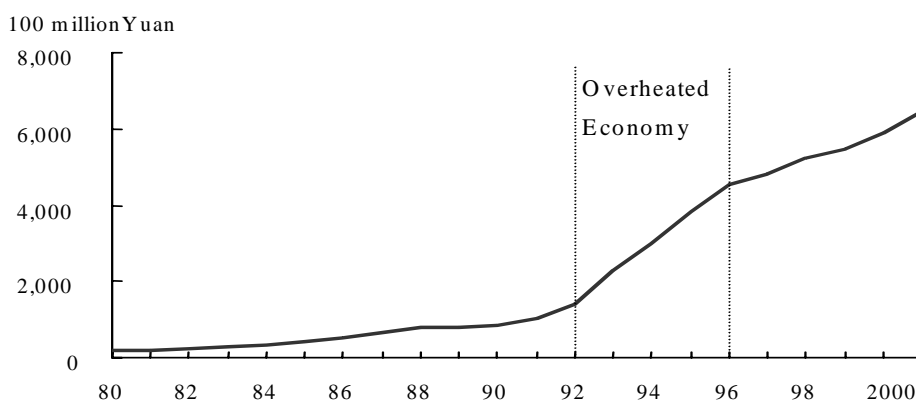
### 1.2 The important role played by the construction industry in the Chinese economy

China’s construction industry accounted for 2.76 trillion yuan (US\$ 333 billion) in 2002, accounting for 62 per cent of total fixed asset investment in China. Value-added generated by the construction industry accounts for 6.7 per cent of China’s Gross Domestic Product (GDP).

The construction industry covers 12 sectors in China, including commercial and residential buildings, roads, railways, port facilities, water and irrigation, electric power generation, mining, smelting, chemical and petrochemical plants, transportation, mechanical installations and urban public utilities.

Since the growth in China’s economy is largely driven by investment, activity in the construction sector closely correlates the development of the national economy, as the construction sector is largely dependent on investment in fixed assets.

**Figure 1.1 The Growth of the Value-added by the Construction Industry**



Source: China Statistics Year Book (2001)

In Figure 1.1, you can see that the construction expanded dramatically between 1992 and 1996, during a period when China’s economy was expanding too rapidly. The growth rate in value-added in the construction sector grew very strongly during this period. Over recent years, the growth rate of value-added has kept pace with the growth in GDP at roughly 7-8 per cent. In this respect, the construction industry can be considered a barometer of China’s overall economy.

### 1.3 The construction industry's ability to absorb huge numbers of unemployed rural labour

In the mid-1980s, economic development in China led to a rapid expansion of construction-related activity, resulting in large inflows of the redundant rural labour force to cope with the demand for labour.

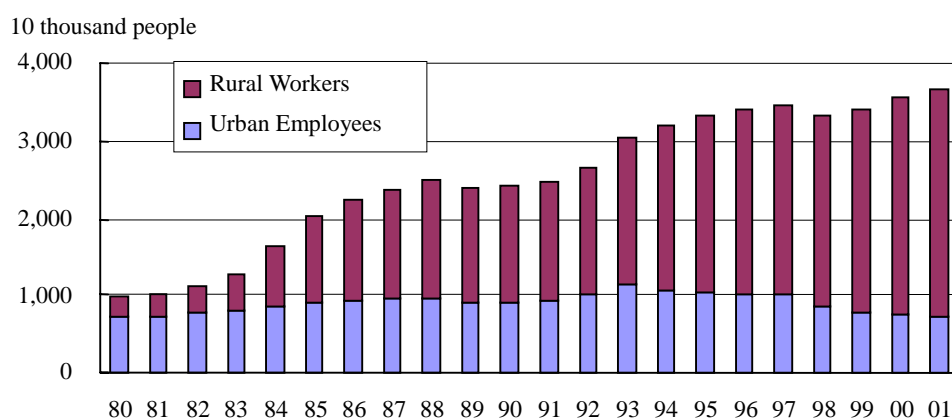
The construction industry was the first economic sector to introduce reforms in the recruitment and employment of workers. As a result of these reforms and because the construction industry is labour intensive and has greater capacity to employ rural workers due to its elasticity, this sector has historically employed more rural workers than other sectors of the economy. Its ability to absorb rural labour has meant that these workers have gradually replaced the urban labour force in this sector, largely due to the industry's tough working conditions.

Rural workers differ greatly from their urban counterparts. Whereas urban employees hold permanent citizenship in the cities in which they reside, rural workers do not. Workers from the cities are employed by construction companies on the basis of labour contracts and can benefit from various social benefits and security. Rural workers are employed by sub-contractors and do not have proper contracts. They are extremely vulnerable since they are not entitled to social benefits and security.

In Figure 1.2, you will see that as of year-end 2001, the construction sector employed 36.99 million workers. Of the total, 29.36 million originated from rural areas compared with just 2.83 million in 1980. In contrast, 7.33 million urban employees were in the labour force in 2001, a marginal increase over the 7.1 million in 1980.

The construction industry has the highest percentage of rural workers compared with any other industries or sectors of the economy.

**Figure 1.2 Comparison between rural workers and urban employees in China's construction sector**



The total labour force in the construction industry accounts for about 5 per cent of total employment in China, although it can account for up to 7 per cent in some of the country's municipalities and provinces, including Beijing, Hebei, Jiangsu and Shandong provinces.

As of 2001, of the total rural labour force, 329.7 million people were engaged in farming/agriculture, forestry, animal husbandry and fisheries, while 161.1 million were engaged in other sectors. About 30 million, or 18 per cent of these workers were employed in the construction sector, a similar level to manufacturing. This highlights the enormous role the construction industry plays in absorbing rural labour in China.

#### **1.4 Stagnant growth in job opportunities in the construction sector**

Since the early 1980s, the size of the workforce in the construction sector has closely mirrored the ups and downs in the construction sector and the fortunes of the national economy. Employment ebbs and flows in line with the slowing or recovery of the overall economy, and the construction industry has been able to leverage the use of rural labour to cope with these fluctuations.

**Table 1.1 Relationship between growth of the construction industry and employment growth**

	1980-1995	1996-2001	1980-2001
Coefficient between value-added created By the construction industry and employment	0.93	0.75	0.87
Elasticity between value-added by the construction industry and the increase in employment	0.39%	0.19%	0.32%
Coefficient between value-added created by the manufacturing industry and employment	0.81	-0.78	0.47
Elasticity between the value-added created by the manufacturing industry and the increase in employment	0.20%	-0.54%	0.10%

Table 1.1 shows that between 1980-1993, the coefficient between value-added in the construction industry and employment stood at 0.93, revealing that the construction sector benefitted from both economic development and employment creation. Elasticity between value-added and the increase in employment stood at 0.39 per cent during the same period.

In other words, for roughly one per cent growth in value-added in the construction sector, employment in the sector grew by 0.39 per cent. This shows that the rapid development of the construction industry since 1980 has created a huge number of jobs, far higher than other economic sectors.

Table 1.1 also shows how the coefficient and elasticity between value-added and employment in the manufacturing industry are lower than in the construction sector. Between 1996-2001, coefficient and elasticity were negative, demonstrating the manufacturing sector's inability to generate new job opportunities.

While the construction sector has continued to expand since 1996, its ability to spur employment has faltered. This has even meant that some years have seen a decline in the rate of employment recorded for the construction industry. It is essential to further examine the issue of

employment in the development of the construction sector, as we have clearly seen the importance of the sector in terms of its ability to generate employment for rural labour.

### ***1.5 Reasons for the stagnation in employment growth in the construction sector***

As we can see in Figure 1.2, growth in employment in the construction sector has eased due to a decrease in the number of urban-based employees and limited growth in the number of workers from rural areas. The number of urban workers employed in construction peaked at 11.53 million in 1993, and has gradually decreased ever since. On the same chart, we can see that growth in the number of rural workers has steadily decreased over recent years.

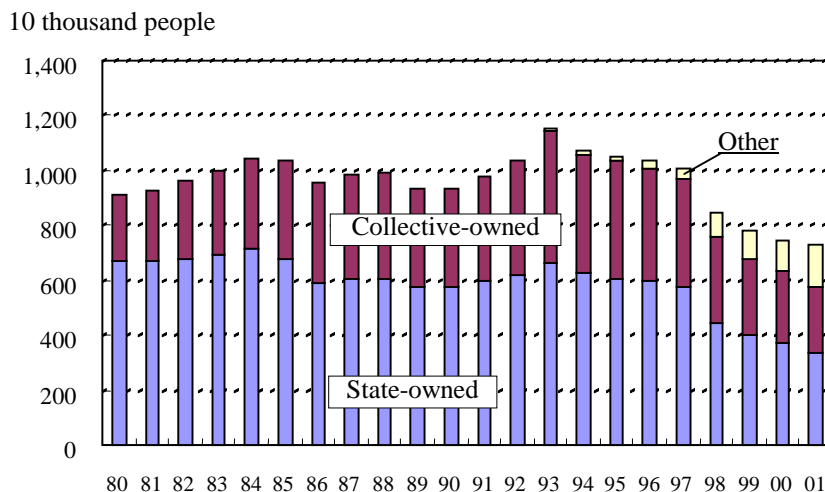
The reasons behind these trends differ, and we will go on to examine these in detail.

#### ***Easing in growth of urban employees employed in the construction sector***

The main reasons behind the reduction in employment growth of urban-based workers in the construction sector are reform of State-owned enterprises and a change in the recruitment and employment system. We will concentrate on the former, while analysis of the latter can be found in Chapter 2 of this report.

We can see in Figure 1.4 that the majority of the labour force in the construction sector during the 1980s and 1990s worked in state-owned enterprises and construction brigades from rural areas. During the latter half of the 1980s, there was an increase in the number of workers employed in the rural construction brigades.

**Figure 1.4 Employment by form of ownership among construction enterprises**



During the 1990s, both collective-owned and state-owned enterprises recorded periods of growth until the late 1990s when the effects of restructuring of state-owned enterprises and the construction sector began to kick in.

During the late 1990s, the number of workers employed in state-owned enterprises and rural construction brigades decreased dramatically, while at the same time we can see a

dramatic increase in the number of workers employed in collective-owned or privately-owned construction enterprises.

This whole situation is closely linked to the reform and restructuring process.

The first reforms of state-owned construction enterprises began in 1994, focussing on ownership changes. Some became shareholding enterprises through restructuring, some went into bankruptcy or were transferred to other entities, while some were forced to reduce staffing levels. At the same time, more and more state-owned enterprises had to reduce the number of urban employees on their books.

The main outcome of the reforms to the construction sector is that the percentage of construction enterprises under State ownership in the construction sector has decreased significantly as the percentage of collective-owned enterprises, shareholding enterprises, partnerships, private enterprises and Sino-foreign joint ventures (JVs) has grown strongly.

Most privately-owned construction enterprises are small and medium labour-based subcontractors. Guangdong, Zhejiang, Fujian, Shandong, Henan and Hebei provinces are particularly important in terms of this kind of operation. Different levels of government have been encouraging the development of these enterprises to help promote local employment and economic development.

Many such enterprises go on to become large-scale enterprises and the impact made by the reforms as well as these enterprises has been both unprecedented and dramatic. Today, only 35 per cent of enterprises in the construction sector are state-owned, while employment in these enterprises now only accounts for about 20 per cent of total employment in the construction sector. Figure 1.2 reveals a marked drop in employment of urban workers since 1997, while gross output has decreased dramatically. A less dramatic, yet still significant reduction in the number of workers in collective-owned constructive enterprises shows that the impact of the reforms was not limited to state enterprises.

While there has been a slump in employment of urban employees in state-owned and collective-owned enterprises, the number of urban workers flocking to non-public enterprises jumped to 1.54 million by 2001, representing almost half the number employed in state-owned enterprises (3.36 million) and getting closer to the 2.43 million employed in collective-owned enterprises. Note that non-public owned or non-public controlled enterprises are a mix of newly set up enterprises, or those that have been converted from state-owned or collective-owned enterprises.

By 2001, employment by non-public owned enterprises accounted for 21 per cent of the total number of urban employees in the construction industry, while the number employed by state-owned or state-controlled enterprises had fallen to 45 per cent of the total (Table 1.2). Remaining jobs (33.1 per cent) resided in collective-owned enterprises.

**Table 1.2 Percentage of urban employees with regard to enterprise ownership**

Years	Urban Employees			Gross Output Value of the Construction Industry			Total
	State-owned	Collective-owned	Others	State-owned	Collective-owned	Others	
1980	94.9%	33.4%	0.0%	77.0%	23.0%	0%	100.0%
1985	75.5%	39.3%	0.1%	70.3%	29.7%	0%	100.0%
1990	64.2%	39.8%	0.2%	69.5%	30.5%	0%	100.0%
1991	63.4%	40.5%	0.3%	67.9%	32.1%	0%	100.0%
1992	62.0%	41.7%	0.4%	65.9%	34.1%	0%	100.0%
1993	57.5%	41.5%	1.0%	59.8%	33.9%	6%	100.0%
1994	58.7%	39.8%	1.5%	64.1%	32.1%	4%	100.0%
1995	57.4%	40.6%	2.0%	62.5%	32.3%	5%	100.0%
1996	57.5%	39.8%	2.7%	50.2%	44.6%	5%	100.0%
1997	57.5%	39.1%	3.4%	49.6%	43.0%	7%	100.0%
1998	52.5%	36.7%	10.8%	45.4%	37.7%	17%	100.0%
1999	51.2%	35.8%	13.0%	43.6%	33.9%	22%	100.0%
2000	50.0%	35.1%	15.0%	40.4%	29.5%	30%	100.0%
2001	45.8%	33.1%	21.0%	34.9%	21.7%	43%	100.0%

Source: China Labour Statistics Yearbook 2001

Another major reason behind the fall in the number of urban employees in state-owned enterprises is reforms to the recruitment and employment situation within state-owned construction enterprises since the mid 1980s. This issue is examined in greater detail in Chapter 2 of this report.

### *Sluggish growth in the number of rural workers employed in the construction sector*

The main reasons this report refers to urban ‘employees’, while referring to rural ‘workers’ is because the two groups are not interchangeable. ‘Employees’ is therefore used to refer to city-dwelling men and women who largely hold management or technical roles and are employed on long-term contracts, unlike rural workers, who are mainly employed on temporary contracts.

While greater industrialization and an increase in equipment-based work has limited impact on urban jobs in the construction sector, it deals a heavy blow to rural workers who largely carry out manual labour, since improved efficiency through equipment-based operations results in job losses.

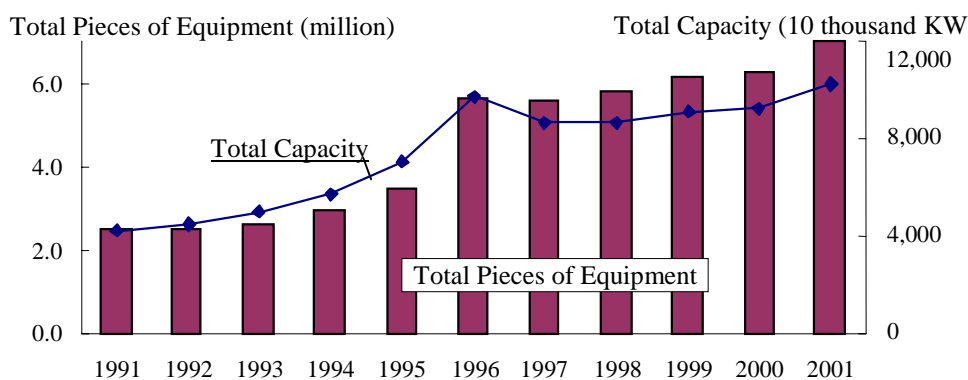
Light and heavy construction equipment has long been used in China’s construction sector, heavy equipment resulting in an improvement in productivity over manual labour. Such heavy equipment includes diggers and drivers that are used to prepare foundations for high-rise structures, and specialist equipment to dig large tunnels, work on canals, irrigation systems and for power generation.

The growth in energy, transportation and irrigation projects since the 1980s fuelled demand for this kind of machinery. The construction of high-rise buildings in cities relies heavily on cement mixing plants, tower cranes and equipment for digging foundations and is highly visible in China’s burgeoning cities.

When compared with other countries, the use of light construction equipment and tools is quite limited. Such equipment would include painting and coating machines, mechanized saws, planes, as well as cutters and grinders that are mainly used in the preparation of interior fittings. They are used for specific tasks and help further reduce labour costs, improve efficiency and labour productivity.

The scope and scale of equipment used on China's construction sites has increased dramatically over recent years. Since 1996, there has been steady growth (Figure 1.5) in the use and capacity of such equipment. A particularly aggressive expansion can be seen in 1996. Unfortunately, while this represented a significant development for the construction industry, on the other hand it had a negative impact upon employment opportunities.

**Figure 1.5 Capacity performance of construction equipment**



In the housing sector, the two biggest trends to have impacted upon employment are the growth in pre-mixed concrete that has gradually replaced on-site mixing since the late 1990s, and the growing use of pre-fabricated products for interior fittings.

More facilities and machinery are required to produce and transport concrete compared with having on-site mixing plants, and this means fewer workers are required to carry out these tasks.

The following formula describes developments in mathematical terms:

$$\text{Log (rural workers)} = 1.60 + .51 \text{ Log (value-added by construction)} - 0.11 \text{ Log (power of machinery and equipment owned per capita)}$$

$$R^2 = 0.96$$

The coefficients used represent elasticity values, meaning that a one-per cent increase in value added by the construction industry represents a 0.51-per cent increase in the number of rural migrant workers, while a one-per cent increase in the power of machinery and equipment represents a 0.11-per cent decrease in rural labour. Through the above regression analysis, we can see an experiential validation that industrialization reduces the degree of labour input required.

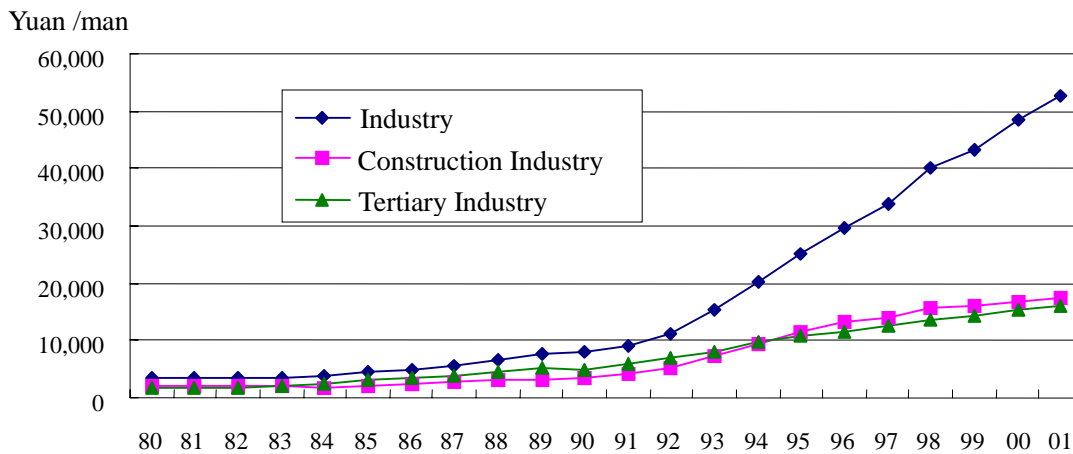
So while mechanization and industrialization in the construction industry plays a significant role in the promotion of technological development and social progress, it is a major factor in terms of the potential for employment in the sector over the longer term.

Policies relating to mechanization and industrialization should therefore consider both the technological factors and the potential impact upon social progress in the future when being developed.

***Labour productivity in the construction sector***

Labour productivity has improved due to the reform of state-owned enterprises and the wider use of construction equipment.

**Figure 1.6 Labor Productivity in the construction sector compared with other industry types**



In Figure 1.6, we can see that productivity in the construction sector is far lower than in manufacturing, but began to overtake productivity in the service sector around 1994-5.

The reform of state-owned construction enterprises and the development of mechanization and industrialization have therefore improved productivity in the sector, but depleted employment opportunities. While greater efficiency and improved labour productivity were the objectives of reform and greater development, a heavy price was paid in terms of employment opportunities.

## **Chapter 2**

### **A review and analysis on industrial and employment policies in China's construction industry**

#### ***2.1 The impact of industrial restructuring and reform of state-owned enterprises in the construction sector***

- 2.2 Adjustments to the system of recruitment, and the establishment of the labour supply base
- 2.3 Policies regarding mechanization and industrialization

#### ***2.1 The impact of industrial restructuring and reform of state-owned enterprises in the construction sector***

##### ***The path of reform and reorganization***

Construction led the way in 1984 when various reforms began in an effort to make the adjustment from a planned to a market economy. Over a period of 10 years, the reforms led state-owned construction enterprises to adopt a market mechanism in the operation and recruitment of workers. Subsequently, the efficiency and labour productivity of these entities improved.

Since 1994, the restructuring of the construction sector entered a new era through the ushering in of a modern corporate system. The Ministry of Construction selected 41 construction enterprises to test out a modern corporate system within state-owned construction enterprises. Of these, 13 were transformed into state-owned companies, 10 became limited liability companies, and 5 became shareholding companies (including one public listed company on the stock market). Based on the lessons learnt from this move, the Ministry of Construction extended the reforms to apply the modern corporate system throughout the sector. The major components of the reforms are:

- Adopting standardized corporate reorganization for large scale enterprises to achieve:
  - A clearer understanding regarding ownership
  - A precise definition of roles and responsibilities
  - A separation of government functions from the enterprises
  - Scientific management
  - Adapting the management mechanism to the market economy, and
  - Improving the efficiency of enterprises

Apart from a very small number of large enterprises or groups that can be transformed into solely state-owned companies, most companies in the sector have multi capital structures with harmonious share ownership in the hands of the State, company and individual employees. These companies can easily be converted into limited liability companies or shareholding companies in order to ensure the objective of separating ownership from operations.

Assuming they meet the requirements, limited liability companies can apply to be listed on the stock exchange. The government has focussed on forming groups of large enterprises and conglomerates which are competent and competitive across regions, business lines and industries.

### *Leaner and fitter*

Historically, most state-owned construction enterprises have been overstaffed. In any reorganization of an enterprise, a restructuring of staffing, including issues related to redundancies, is a very important factor. The options available in terms of the challenge in reducing staffing levels are:

- Not renewing labour contracts on expiration
- Early retirement programmes
- Offer incentives to terminate employment
- Offer incentives to find alternative employment
- Diversify operations
- Transfer staff to support auctioning or lease agreements of the enterprise
- ‘Buying out’ contracts
- Job retraining programmes, and
- Dismissal under discipline

The medium and large-sized state-owned enterprises have gradually become more management- and knowledge-centered organizations due to the various reforms, restructuring and through reassignment and redundancies.

### *Changes in ownership structure*

Small and medium-sized state-owned and collective-owned enterprises have been converted into shareholding companies through reorganization, partnership, merging, leasing, contracting or sale, and the trend has been for these entities to become specialized enterprises. Those that have suffered from continuous losses, have high liability to asset ratios, or have little chance of turning a profit are forced into bankruptcy.

Construction is a mainstay of China’s national economy, but is also a highly competitive industry. These characteristics dictate that ownership within the construction sector should be diversified. Enterprises with different ownership structures should all get the chance to develop and coexist.

The government has been encouraging the development of privately-owned enterprises by taking effective measures to protect their legal rights and benefits. Those that were originally thought to be collectively-owned, yet have turned out to be controlled by individuals or groups of individuals are often reorganized into privately-owned enterprises.

By the end of 2000, it was estimated that 12,827 enterprises in the construction sector had changed their ownership structures to the modern corporate system, which accounts for 28 per cent of the total (qualification by certificate). Of the total, limited liability companies accounted for 7,833, 1,983 were solely state-owned entities companies 1,844 were shareholding companies, 227 were conglomerates, while 23 were public companies.

The number of collective-owned or privately-owned construction companies has grown rapidly, while the number of state-owned companies has steadily dropped. Some privately-owned enterprises are listed on the Stock Market, while others are buying into other companies. Reforms led to job losses, relocations and other outcomes for state-owned enterprises. However, these companies

still offer advantages in terms of financing, technology and management over other ownership entities that are labour-intensive.

After China gained accession into the World Trade Organization (WTO) at the end of 2001, some international engineering and construction companies started setting about forming joint venture companies with Chinese partners to move towards the opening up of the market. This could be a sign of possible further redundancies in state-owned construction enterprises.

### *New qualification classification system emerges (labour supply subcontractors)*

In the late 1990s, China's construction industry was suffering from a fall in profits and poor quality in completed projects. This was largely seen to be due to insufficient financing with which to proceed with the work and purchase materials.

The market was highly competitive at that time and it was felt that far too many companies were competing for a single project. Many construction enterprises held certificates that allowed them to be general contractors. Project prices fell and the market become unreasonably competitive. In order to deal with this situation, new procedures and qualification criteria were set to make it more difficult to enter the market in such a way, and to ultimately reduce the number of general contractors qualified to tender for projects with a total investment of over 20 million yuan.

The new criteria classified construction enterprises into three clear groups: general contractors, specialist contractors and labour supply subcontractors, the latter representing a new category. The new system sub groups general contractors into 12 different categories, specialist contractor into 60 types and labour supply subcontractors into 13 forms. The new system had been implemented by 2002 with the aim of reducing the number of large-sized enterprises so that those with strong financial ability, a good technology base, talented executives, a good record as a general contractor in construction or engineering, good management and high productivity could come to the fore.

Specialist and labour supply subcontractors provide construction and labour services, and so many of the jobs would have shifted to these companies in an ideal situation.

The system was aimed at creating job opportunities rather than stifling them, and large-sized, tech-focussed construction enterprises would act more like general contractors and providers of project management services, while labour supply subcontractors and specialist contractors, such as those involved in interior fittings, would become major providers of labour. Market entry was eased for specialist and sub contractors, which are mainly small- and medium-sized enterprises (SMEs). The new system validated the supply of labour by subcontractors and thus protected the benefits of companies in this business.

The government had hoped this new classification system would result in a drop in the number of large-sized enterprises and growth in the number of small- and medium-sized enterprises in the construction sector. While it was hoped that more subcontractors would be established, expectations have not been met and only a small number have emerged. Many construction firms have not yet recognized the value of the labour supply qualification certificate.

Many have tried very hard to get the specialist of general contractor qualification, and the general feeling is that standards and policies for the labour supply certificate require adjustments and modifications.

## ***2.2 Adjustments to the system of recruitment, and the establishment of the labour supply base***

### ***Shift towards a market mechanism***

The reform of the recruitment system used by construction enterprises, which began in the 1980s, brought about a shift from the planned allocation system of labour recruitment in the construction sector to a market mechanism.

The construction industry was selected as an experimental economic unit for urban economic system restructuring in 1984. The State Council promulgated Document No. 23 clearly states that installation companies not recruit and employ salaried employees, except in the case of technical engineers, in an effort to reduce the ratio of salaried workers and increase significantly the percentage of temporary and contract workers. The reform of the labour recruitment system was first introduced to state-owned enterprises in 1986, and rural workers perfectly met the requirements of the more flexible labour market.

### ***Greater labour flexibility***

Labour in the construction sector now comprises contract employees, temporary employees, rural contract workers, temporary rural workers, and rural workers from the rural construction brigades. Previously, construction enterprises had only included salaried and temporary employees. Contract employees are largely in senior management positions, while rural workers mostly work in manual jobs and at an operational level.

It is still relatively difficult to guide management-level employees through the contract system because it is always very difficult to downsize at this level. However, at an operational level, it is easier to readjust the labour force.

Since the 1980s, the reorganization and restructuring of construction companies has been based on a restriction on new hires, control of the size of the workforce, and flexibility in the use of rural workers. These rural workers have gradually moved towards the construction brigades. They have close links with either construction enterprises or labour supply subcontractors, most of which are collectively owned. The emergence of these brigades has helped the construction industry not only in stabilizing the supply of labour and in securing quality, but also in providing greater flexibility. This has helped construction administrators and management to better manage the labour market.

### ***The movement of rural labour to urban construction sites***

By 1998, rural workers from other provinces accounted for 85 per cent of the labour force in Beijing. With the establishment of a market mechanism in construction labour recruitment and the increase in rural workers, a proposal to set up a construction labour supply base was put forward. The objectives were:

- To minimize inefficiencies and confusion in the labour market at an early stage
- To promote an orderly flow of labour for construction
- To train up a high quality labour force for the construction sector
- To support the development of underdeveloped regions

In 1988, the Ministry of Construction defined 30 counties as state-level construction supply bases in underdeveloped regions. In 1992, the Ministry issued 'Interim Regulations on Management of the Construction Labour Supply Bases'. Provinces selected to supply a labour force have also selected their own respective labour supply bases within the regions. The cities with a demand for rural construction workers are allowed to express a preference in the source bases supplying workers.

Rural construction brigades are established at the town level and labour companies at county level. Rural workers are sent to a city site once training has been completed at labour supply bases.

By the end of 2000, there were about 100 labour supply bases established at provincial level, mainly located in Jiangsu, Hebei, Anhui and Shandong provinces. These bases represented a rich supply of labour for the construction sector.

In Jiangsu Province, there are 2.35 million construction workers, and 940,000 of them are employed outside the province. In the province of Henan, 1.8 million people work in the construction sector, 650,000 outside the province.

The big cities that need the workers use many methods to attract the labour brigades and construction companies. Beijing has defined 62 labour supply base counties. Every year 500,000 more rural construction workers flock to work in Beijing. The supply base list is revised every two years.

While it should be acknowledged that individual undocumented rural migrants are also attracted to the cities, only a limited amount are individually employed on construction sites. This is largely due to the fact that a work permit has to be issued by city governments to every rural worker, and this is usually issued to managers from labour supply subcontractors for a group of workers. Additionally, managers from labour supply subcontractors are reluctant to hire rural workers individually as they have no idea of the worker's background, abilities and experience.

Construction administrations in the regions importing and exporting labour play a leading role in the management of the labour supply base. Administrations in medium- and large-sized municipalities requiring rural workers administer and monitor market entry of the construction labour brigades and adopt a very rigid registration system. For example, in Beijing:

- Only labour brigades from registered labour supply bases can enter the market
- The construction administration in labour exporting areas can establish management offices in Beijing to provide administrative support.
- The details of workers and operators from construction enterprises located outside Beijing must be registered with the Beijing Construction Commission; and
- There are strict standards and requirements with regard to the training and qualifications of construction workers

The construction administration in source regions are responsible providing administrative support for labour in the following areas:

- The provision of basic skills training and evaluation of the workers, ensuring the skills of the workers meet the requirements of the regions importing the labour
- Workers are registered in labour companies and exported through these companies. The local government is responsible for organizing the transit of the labour to the other region.

Local government from the regions exporting the labour assist the destination regions with administration in the following areas:

- The allocation of each individual worker
- His or her position
- Terms of the contract
- Income
- The provision of a record of the worker's skills

It can be seen that organized legal migration of labour through construction labour supply bases establishes an efficient channel for satisfying labour demand with a steady and quality supply of workers. The construction sector has clearly benefitted greatly from the use of rural construction workers, who have helped it get a sufficient supply of labour.

### ***2.3 Policies regarding mechanization and industrialization***

Since the 1990s, many policies have been enacted with a view to enhancing science, technology and industrialization. They have played an important role in the rapid development of the construction industry.

In 1992, the Ministry of Construction launched a 10-year, long-term programme on 'Technological Development of Construction Enterprises and Outlines of the Eighth 5-year Plan', and further proposed throughout the 1990s that the development goals regarding construction technology be accommodated within the Eighth 5-year Plan.

The Ministry also listed 38 key development projects in the areas of underground engineering and deep foundation construction, concrete and pre-stressed concrete, waterproofing, the upgrading of machinery and equipment and computer applications. All of these have provided guidelines to construction enterprises in the development and promotion of construction technologies.

To build on its efforts to upgrade technology in medium- and large-sized, state-owned construction enterprises, the State has been allotting special funds that focus on:

- Building or revamping concrete mixing plants
- Upgrading equipment owned by construction enterprises and developing equipment leasing businesses

These two strategies have played a fundamental role in enhancing mechanization and industrialization in construction enterprises.

#### ***Industrialization Outlines of the Construction Industry***

The outlines call for:

- The use of advanced and applicable technology and equipment
- Execution and organization of construction in a scientific way
- Assignment of construction work to specialized companies
- An improvement in industrialization

- A reduction in heavy and complex manual operation, and;
- A conversion of labour-intensive and extensive operations to a higher level

In 1997, the Ministry of Construction rolled out a 'Policy on Construction Technologies 1996-2010'. This policy says that by the end of 2010:

- The average per capita power equipment ratio for the construction industry should grow by 60 per cent from its then level of 4.7 kw per capita
- The contribution in terms of the development of the industry through this rise should account for more than 50 per cent

It also requires that:

- The percentage of pre-mixed concrete should be increased. Medium- and large-sized cities should have sizable concrete pre-mixing plants in suitable locations.
- Existing concrete component plants should be converted into concrete pre-mixing plants
- By 2000, the annual production of pre-mixed concrete needed to increase to 40 million cubic meters from 26 million cubic meters, representing about 20 per cent of the amount of cast-in-place concrete used
- Production should hit 120 million cubic meters by 2010, accounting for 40 per cent of cast-in-place concrete
- In huge cities like Beijing or Shanghai, the aim should be 60-80 per cent of cast-in-place concrete, close the level found in developed countries.

It also calls for:

- A variety of large construction machinery to be developed that should be multi functional and environmentally friendly to improve mechanization and industrialization of the sector, and to improve the quality of the equipment available to construction enterprises
- During upgrading, advanced machinery should gradually replace outdated, low quality, poorly performing, heavily polluting machinery, as well as those that use high energy consumption
- Modern technologies, such as micro electronics, laser technology, microwave, ultrasonic wave or infrared rays should be extensively used in the application of engineering testing and control
- Important work processes, heavy work or dangerous work should be increasingly performed by robots, and;
- Equipment leasing should be developed in order to leverage demand and supply of equipment among enterprises to increase the utilization rate of equipment

In short, the policy on mechanization and industrialization of China's construction industry is targeted at increasing mechanization and labour productivity. The increase in mechanization has become a symbol for development of the construction industry and good results have been achieved. However, the impact on job security caused by the policies has largely been neglected. Worse still, it is widely accepted that the development of mechanization and industrialization is based upon a decrease in employment.

Departmental regulations are usually limited to the scope of the department and therefore fail to address pressing social issues, including the impact on employment. The formulation of appropriate macro policies also requires close attention, as the culture of operating a planned economy still effects the process of formulating new policies and regulations. Departments lack coordination, and do not consult a broad enough range of public views

#### ***2.4 A new policy on interior fittings***

It should be noted that in China, the housing market is not fully commercialized. House designs are simple and have failed to meet the needs of consumers, and historically institutions have been the major purchasers of housing in China.

All houses built for sale in the real estate market during the period 1995-2002 did not include interior fittings as part of the 'finished product'. New owners had to arrange for them to be installed once they purchased the property through a specialist enterprise.

Once individual private buyers became the predominant purchasers in the market, it was clearly close to impossible to coordinate sufficient interior fittings for all of them. Moreover, it seemed highly impractical and unacceptable for buyers to continue to endure more building activity and the noise and dust it generates. While organizing and monitoring the work involves considerable time and energy for the purchaser, they still can't be sure that the quality of the work or materials is up to scratch. In light of such negative factors, the Ministry of Construction formulated 'Implementation Guidelines on One-Off Interior Fittings of Houses for Sale' in July 2002, which aims to:

- Halt the sale of homes in new developments that do not already have interior fittings included.
- Promote the pre-fitting of prefabricated interior fittings and made-to-order interior fittings to provide fully-built homes to consumers
- To halt unnecessary inconvenience for the purchaser
- To improve labour productivity
  
- Shorten the construction schedule
- Improve and ensure quality, and;
- Reduce costs

In October 2002, the Beijing Municipal Construction Commission ruled that the sale of houses without interior fittings already installed would be prohibited. The regulation forced real estate developers and specialized fittings companies to work together to ensure consumers could purchase fully fitted houses. Many developers in Beijing have already adopted this approach and are providing such housing for sale to the public. The initiative is also being promoted in the provinces of Shanghai and Jiangsu. More and more provinces will likely enforce similar rules prohibiting the sale of housing without interior fittings completed.

This policy is expected to have a major impact on the interior fittings market in China, as well as on the enterprises that specialize in this area. Prefabricated and integrated interior fittings are set to become the norm in most homes for private sale. It is likely that the large number of small interior fittings companies will gradually merge into a smaller number of larger operations. This process of streamlining and reducing costs will inevitably result in a drop in the demand for labour in this specialist sector. This will likely hit rural labour particularly hard.

## Chapter 3

### Case studies, including a general construction contractor, labour supply subcontractor, and an interior fittings company

#### 3.1 Background regarding situational analysis

##### Company A

General construction contractor A, a top-class, state-owned construction enterprise, specializes in commercial and residential buildings, and has a secondary business in municipal engineering and public utilities. The company has a Class One Qualification for constructing commercial and residential buildings and is technically and financially astute.

The company has a good image in the market, and has twice been awarded the *Lu Ban Award*, a prestigious award given to leading construction projects in China. Registered in Beijing, the company's main focus is on Beijing, along with some projects in Shanghai and Henan. It employed 2,917 people in 2002 and recorded a total revenue of 1.21 billion yuan. During that year it constructed buildings totalling 606,000 square meters, four times more than was recorded in 1985. Company A's business has expanded rapidly since 1990.

##### Company B

Company B, a non-public owned labour supply contractor, has a long-standing relationship with Company A. Company B employs 1,600 people in Beijing. Its president was once a small contractor in Jiangsu Province, and most of the company's employees hail from this province. It has successfully grown and is now classified as a large labour supply subcontractor.

##### Company C

This Hongkong-based company specializes in high quality interior fittings. Its main business is interior fittings for luxury hotels, office buildings and apartments. It is particularly adept at joinery and owns a large production facility that produces high quality furniture and wooden fittings and furniture.

#### 3.2 The effect on employment in a state-owned company (1985-2002)

Table 3.1 shows that the number of employees in Company A has dropped 39 per cent since 1985.

**Table 3.1 Company A's Employees and Onsite Workers**

Year	1985	1990	1995	2000	2002
Employees	4,800	3,580	3,099	3,111	2,917
On-site workers	7,300	9,280	13,124	11,260	12,417

Source: provided by Company A.

In the early 1980s, most of the company's workers were on-site workers, with only a limited number of technical and management staff. All projects, including on-site operations, were carried out by the company and its significant workforce.

By the mid 1980s, the company was switching focus, and was aiming to be a technology-intensive and management-led general contractor. Facing pressure to cut its staff, it aimed to enhance the organizational structure, and only considered hiring people for technical or management positions. Since then, the number of new hires and recruits has been lower than those retiring or leaving the business. Many salaried employees who worked on site operations have become field supervisors or have retired. Between 1985-2002, the company had reduced its staffing level by 39 per cent.

The company could not resort to layoffs, since management is not fully authorized to make people redundant. During the period in question, the only departures have been through retirement or resignation. Although the number of employees fell to less than 3,000, around 2,000 would have been a more realistic number in terms of its workload at that time, according to management.

It would take an estimated 30 million yuan (\$ 3.6 million) to lay off another 1,000 workers, and this might be better invested in enhancing salaries or to purchase high performance equipment to motivate management and employees and improve productivity.

Unfortunately, the current average management salary of 40,000 yuan (\$ 4,836) differs little from regular employees (30,000 yuan / \$ 3,627). While maintaining an overstaffed and therefore inefficient operation clearly restricts productivity gains, it could be argued that it is necessary in order to keep unemployment low and avoid negative impacts upon society.

### ***3.3 The effect on employment in the sphere of labour subcontracting***

#### ***A leaner, fitter workforce***

Since the mid 1980s, the biggest change in the way that construction projects have been executed is that project operations have now been separated from management. Many of the large construction companies have gradually become general contractors, and employ very few or no on-site workers since labour supply subcontractors frequently carry out this task for them.

A large chunk of Company A is made up of project managers, engineers, field supervisors and a small number of field operatives. These personnel are mostly responsible for particularly technical work, or in areas that require high attention to safety, such as operating tower cranes or other large scale, heavy equipment.

The company is trying to enhance management by recruiting technical and management people with college or university education. At present, 992 employees in the company have graduated from college or university, representing 32 per cent of the total, and of these 42 per cent hold technical supervisory or management positions. Productivity has significantly improves rising from 33 square meters per employee in 1986 to 207 square meters per employee in 2002.

The ratio of management personnel to total employees is around 90 per cent in western companies, but is significantly lower in China. Company A still has too many employees at an operational level and remains overstaffed.

### ***A training challenge facing temporary workers***

Company A's project sites are supplied with labour by subcontractors, so they do not have a direct contract with the workers. Company A used 12,417 workers on its projects in 2002 through subcontractors and most of the subcontractors it uses are from the provinces of Jiangsu and Hebei.

Sub contractors gain a good deal of flexibility in the labour market, which can provide them with higher returns, but it can create instability in the construction sector's labour market. According to a manager in Company B, which provides labour to Company A, only 30 per cent of its own workforce of 1,600 are long-term employees, the remainder being temporary staff. The labour supply subcontractor admits it is challenging to provide temporary workers with technical training. The shortfall in vocational skills and training among temporary workers is seen as a major factor on issues relating to quality and safety.

### ***Labour supply subcontractor category snubbed***

Although Company B has Class One classification, allowing it to construct commercial and residential properties, it is widely known as a labour subcontracting outfit. In 2001, the regulations were revised and a new labour supply category was added. However, many labour supply subcontractors snubbed this category, and chose to aim for a higher-level classification, such as 'general contractor'. In light of this trend, and representing a contradiction to normal business practice in this area, only 2,000 labour supply subcontractors are registered as such, while 30,000 enterprises are registered as general contractors. In normal business practice in the construction sector, a single general contractor uses several labour supply subcontractors. Company B's situation shows that regulations and systems still require revision in order to help the market operate more effectively.

### ***3.4 Case shows effects of mechanization on employment may be limited***

For construction businesses, equipment is a fixed investment requiring major expenditure. Company A set up an Equipment and Materials Department to better manage use of equipment and reduce costs. It is responsible for buying, coordinating and managing the equipment throughout the business.

The company has two equipment leasing businesses that are mainly focussed on internal leasing along with a little external business. One takes the lead in leasing large and heavy machines, including tower cranes and lifting equipment, the other small- and medium-sized equipment and tools, as well as the company's cement mixing and reinforced bar production plants.

Table 3.2 shows that Company A makes a heavy investment in equipment, and expenditure has been steadily growing over the years. Between 1995 and 2002, expenditure grew 47 per cent. The number of items of small, medium and heavy machinery has steadily declined, which has also been the case in terms of total horsepower capacity.

**Table 3.2 Equipment List Owned by Company A**

Year	1985	1990	1995	2000	2002
Heavy Equipment number	90	80	70	70	60
Medium / Small Equipment number	657	634	535	518	496
Total Horse Power (KW)	29,148	25,101	19,251	16,503	15,849
Total Value ( 10,000 Yuan )	1,625	2,274	4,056	4,998	5,918
Investment on Equipment That Year ( 10,000 Yuan )	0.03	76	422	399	822

Source: provided by Company A.

This trend has emerged due to:

- The replacement of less efficient machinery by more modern, high performance machinery
- An increase in the amount of leased machinery

Company A once owned all its own equipment when it operated relatively few projects. As more projects were awarded, it was clear that it would have to make a significant investment in new machinery. In light of this, the company chose to increase its ratio of leased equipment, and currently the ratio of owned/leased machinery stands at about 50:50. In contrast, the company owns all its own smaller construction equipment and tools.

The new more productive machinery is significantly more reliable, and has reduced the failure rate of equipment, while reducing construction schedules and the number of man hours.

In Table 3.3, we can see the ratio between equipment costs and labour costs in the construction of residential buildings. While the margin grew between 1:1.09 in the 1980s to 1:1.21 in 2002, the increase has been minimal. Labour costs grew just 6.9 per cent between 1995 and 2002, whereas equipment costs ballooned between 1995 and 2000. Equipment costs have subsequently eased somewhat during the period 2000-2002.

**Table 3.3 Unit Cost of Equipment, Material and Labor for Residential Buildings**

Year	1985	1990	1995	2000	2002
Equipment (Yuan/m <sup>2</sup> )	12	49	68	210	170
Material (Yuan/m <sup>2</sup> )	137	487	536	836	752
Labor (Yuan/m <sup>2</sup> )	11	73	131	141	140
Total Cost (Yuan/m <sup>2</sup> )	198	813	1,201	1,600	1,300

Source: provided by Company A.

While mechanization has certainly substituted some jobs, the effect has remained fairly minimal due to the fact that labour costs have remained low.

### **3.5 Impact of using pre-mixed concrete on employment**

Before the mid 1990s, concrete was produced on site, requiring more labour and less equipment. The costs were low, since labour was cheap, but there were pollution concerns over the dust and noise produced by these on-site operations. The Ministry of Construction initiated the use of pre-mixed concrete in the mid 1990s, and in 1995 the Beijing Municipal Government ruled

that no on-site mixing was to take place at project sites within the Third Ring Road. This rule was expanded to include the Fourth Ring Road in 1998, and from this point pre-mixed concrete utilized at sites based within the area.

The use of pre-mixed concrete has had the most significant effect on labour, according to officials from Companies A and B. According to calculations provided by Company A, the use of pre-mixed concrete can save nearly a quarter of working days (see Table 3.4).

**Table 3.4 Impacts on the Unit Cost of Equipment, Materials, Labor and Man-day by Using Premixed Concrete, Compared to On-site Concrete Mixing**

	On-site Concrete Mixing (a)	Pre-mixed Concrete s(b)	( (b)-(a) ) /(a)
Equipment (Yuan/m <sup>2</sup> )	30	65	117%
Materials (Yuan/m <sup>2</sup> )	81	83	2%
Labor (Yuan/m <sup>2</sup> )	16	12	-25%
Total (Yuan/m <sup>2</sup> )	127	160	26%
Man-days	0.5	0.375	-25%

Source: provided by Company A.

This is offset, however, in terms of equipment costs that are 117 per cent higher than that use for on-site mixing. Equipment used in the transportation of pre-mixed concrete add a further 2 per cent to materials costs, so many companies continue to use on-site mixing in areas where they are permitted to do so. Large businesses, such as Company A, find it efficient to supply their own projects via their own mixing plants.

### **3.6 Impact of using pre-fabricated interior fittings on employment**

In the past, housing in China was sold ‘part-built’, meaning that the developer was only responsible for the main structure, frame and external fittings of the property. The term interior fittings includes doors, flooring, plastering, layout of electrical lines, pipes and fabricated furniture (handles, window latches etc).

Purchasers would employ small specialist companies to install the interior fitting in accordance with the owner’s budget and preferences. Bricklayers, carpenters and painters carried out most of the work, which took place on site. This created many job opportunities and owners were happy to have the freedom to customize the designs of their residences. On-site design and fitting of interior fittings was also commonly used in hotels, office buildings and other commercial buildings. It should be noted that costs were kept relatively low.

**Table 3.5 Comparison of the Man-Days When Using On-site Interior Fitting and Pre-Fabricated Interior Fittings**

	Man Days Required When On-site Interior Fitting Used ( a )	Man Days Required When Pre-fabricated Interior Fitting Used ( b )	((a)-(b))/(a)
120 Square Meters Residential House (woodwork)	100-120	60-72	40%

Source: provided by Company A.

In 2002, Beijing Municipal Government ruled that within three years only houses with interior fittings installed could be sold in the market. Since developers will seek fittings from a single source, this is likely to be pre-fabricated in factories. On-site fabrication is therefore eliminated or significantly reduced, while installation activity expands. According to Company C's calculations, only 60-72 work days are required to install pre-fabricated interior fittings, in contrast with 100-120 work days when using on-site fabrication (see Table 3.5). This represents a whopping 40-per cent reduction in labour requirements.

Since Company C is a large company specializing in interior fittings, it operates a factory to produce the hardware. It invested 100 million yuan in wood processing equipment from Europe and Japan, including a computer-aided wood carving machine, sawing and cutting machines, a laser cutting machine, multifunctional edge bending machine, as well as a painting line and drier.

A medium-sized factory would require an investment of around 20 million yuan, while a small operation with the minimum level of equipment would require 1 million yuan. While many large-scale interior fitting companies can afford to have their own fabrication plants, the majority of the businesses operating in this area are very small, both in terms of access to investment and in terms of the size of their workforces.

Company C is in favour of using pre-fabricated interior fittings to:

- Improve the quality of products, such as the surface of wood and quality of paint finish
- Shorten the construction schedule
- Reduce the number of man hours
- Save on all manner of materials and develop new materials; and
- To promote on-site safety. On-site fabrication poses considerably more on-site hazards due to on-site storage of materials

The government is promoting organized and standardized interior fittings to promote improved safety. In the past, home owners often changed the structure of their properties without prior authorization of the developers when decorating. The noise and dust was unpleasant for nearby residents. Despite the efforts to promote pre-fabricated interior fittings, there is still some resistance among consumers, many of whom wish to customize interior fittings to meet their own requirements.

### ***3.7 Other factors making an impact on employment***

While it has been noted that there is a 'training gap' among many workers in the construction sector, it should be noted that the boom in the industry in the 1990s meant that many of the rural workers attracted to the industry since then have now garnered a significant amount of on-the-job experience.

Except for the case of interior fittings, pre-fabricated products have yet to become widely used in China. This is particularly true in relation to high-rise buildings, which have had to be constructed in line with strict anti-seismic standards since the 1990s. This means that on-site concrete pouring is commonplace when constructing high-rise buildings, and it is only recently that pre-fabricated blocks have become more widely used for non-load bearing partition walls.

The impact of pre-fabricated products on employment has therefore been limited to the impact of the trend in interior fittings.

While Company A's construction output jumped from 160,000 square meters in 1995 to 600,000 square meters in 2002, the workforce has shrunk from 13,124 to 12,417 during the same period. Project owners have shifted to a contracting strategy, while mechanization, industrialization and all the factors discussed previously have meant that while Company A's workload has soared, employment has actually fallen.

## **Chapter 4**

### **Developments and forecasts on China's construction sector**

#### *Construction sector growth forecast*

Based upon the Government of the People's Republic of China's 10<sup>th</sup> Five-year Plan regarding the development of the construction industry, as well as various forecasts and analyses, it is expected that China's economy will continuously grow at a pace of around 7-8 per cent per year by 2010.

Investment in fixed assets, a major driver in domestic demand, is estimated to grow at a rate of 9-10 per cent per year, which should allow the construction industry to benefit. The construction industry is estimated to grow by 8-9 per cent per year.

#### *A drop in the labour force in the construction sector*

With the effect of reforms of state-owned and collective-owned enterprises intensifying, the number of such entities is set to further decrease. Potential growth and development will depend more upon non state-owned enterprises, and total employment in the construction sector will shrink further before making some improvement.

We will examine to what extent the labour force in state- and collective-owned enterprises will decline, and then look at the potential for employment growth within non state-owned firms.

The reduction in jobs in state-owned and collective-owned enterprises will more likely be driven by the reforms and restructuring than by general growth levels in the sector. Over recent years, such enterprises have reorganized and been restructured, often resulting in redundancies. The good news is that this decrease should slow over the coming years.

As pointed out in Chapter 1 of this report, the average number of employees should be maintained at around 400, and some efficient large state and collective-owned enterprises will continue to operate.

The following mathematical formulae results in an estimate of future employment in state-owned enterprises, based upon the reduction in employees during the period 1997-2001.

#### **Formula 2:**

$$\text{Log (employees of state-owned enterprises)} = 0.108/\text{Log (year)} + 2.410$$
$$R^2 = 0.973$$

#### **Formula 3**

$$\text{Log (employees in collective-owned enterprises)} = 0.098/\text{Log (year)} + 2.274$$
$$R^2 = 0.982$$

This explains that eventually the total number employed in state-owned enterprises will stabilize at around 2.57 million and in collective enterprises at around 1.88 million, making a total of 4.45 million. Over a 10-year period this would represent a reduction of 1.3 million employees when compared with the 5.59 million recorded in 2001.

#### **Formula 4**

$$\begin{aligned} \text{Log (employees in non state-owned enterprises)} &= 2.333 \text{ Log (value-added by the} \\ \text{construction industry)} - 6.849 \\ R^2 &= 0.973 \end{aligned}$$

This formula through regression since 1992 shows that the number of employees in non state-owned enterprises will continue to grow in line with expansion of the industry. This highlights that a one-per cent growth in value added by the construction industry results in a 2.33-per cent increase in jobs in non state-owned enterprises.

An eight per cent increase in value added could result in up to 500,000 new jobs in the non state-owned construction enterprises. By the end of 2006, this would swell the ranks of those employed in the private sector to 3 million.

While these forecasts sound positive, it must be noted that as a whole, the number of jobs in the construction sector has decreased. This trend is expected to reverse and employment in the sector is expected to increase to 9.62 million by 2010. During 2005-2006, it is expected that the number of employees non state-owned enterprises will outnumber those employed in state-owned entities. The government clearly believes that the development of the private sector is an important part of solving employment problems in China's cities.

#### ***Growth in the use of rural workers***

The growth in the use of rural labour in the construction sector has come about due to growth in the sector, industrialization and mechanization, as well as through new policies, such as the policy on interior fittings.

Table 4.1 shows that the average per capita rate of machinery and equipment grew by 4.6 per cent (per year) between 1996-2001, higher than the 3.2 per cent target set in 1996 due to a decrease in staffing levels. During the same period, the per capita power rate of machinery and equipment used only by rural workers rose by only 1.9 per cent, suggesting that mechanization did not advance enough during that period.

If we assume value-added in the construction sector grows at 8 per cent (per year) between 2002-2005, and that the per capita power rate of machinery and equipment used by rural workers grows by 1.9 per cent (per year) in accordance with Formula 1, the number of rural workers employed in the construction sector will increase 14.3 per cent, reaching 33.56 million by 2005 and 39.81 million by 2010.

**Table 4.1 Changes and Forecast on Rural Workers in the Construction Industry**

Year	Per Capita Power Rate of Machinery & Equipment of the Construction Industry (KW/person)	Growth Rate of the Per Capita Power Rate of Machinery & Equipment in the Construction Industry	Per Capita Power Rate of Machinery & Equipment of Farm Workers in the Construction Industry ( KW/person )	Growth Rate of the Per Capita Power Rate of Machinery & Equipment of the Farm Workers in the Construction Industry	Farm Workers of the Construction Industry (10,000)	Growth Rate of the Farm Workers (Every 5 Years)	Number of Farm Workers of the Construction Industry (Every 5 Years)
1980	-	-	-	-	283	-	-
1985	-	-	-	-	1,135	301.1%	852
1990	-	-	-	-	1,528	34.6%	393
1991	1.71	-2.7%	2.76	-	1,542	-	-
1992	1.67	-2.6%	2.66	-3.4%	1,665	-	-
1993	1.62	10.4%	2.61	-2.0%	1,897	-	-
1994	1.79	18.5%	2.70	3.5%	2,116	-	-
1995	2.12	35.4%	3.11	15.2%	2,269	48.5%	741
1996	2.88	-12.6%	4.13	32.9%	2,373	-	-
1997	2.51	3.5%	3.55	-14.2%	2,445	-	-
1998	2.60	2.3%	3.49	-1.6%	2,481	-	-
1999	2.66	-2.3%	3.45	-1.2%	2,634	-	-
2000	2.60	7.5%	3.29	-4.6%	2,807	23.7%	538
2001	2.79	-2.7%	3.49	6.2%	2,936	-	-
2005 (Forecast)	-	-	3.76	1.9% ( each year )	3,356	14.3%	420
2010 (Forecast)	-	-	4.14	1.9% (each year)	3,981	18.6%	625

Source: China Labor Statistics Year Book

Table 4.1 examines the changes and records the number of rural workers employed in the construction sector since the 1980s. It is clear that the increase in rural workers will start to significantly slow by 2005. Even if the industry grows at 8 per cent and mechanization develops at its current rate of 1.9 per cent (per year), it will not be able to provide sufficient employment opportunities. Mechanization should therefore maintain or reduce its present level of development in order to improve the opportunity for more rural workers to be employed.

### ***The effects of the shift towards using pre-mixed concrete on employment***

Forecasts in this area have been calculated based upon micro factors rather than macro factors. It is restricted to house building activities and focusses on mechanization and industrialization policy with regard to the utilization rates of pre-mixed concrete and pre-fabricated products used for interior fittings.

According to the *China Statistics Year Book*, there were 25.39 million rural workers engaged in the business of construction and civil engineering in 2001. This number does not include workers engaged in laying pipes, installing equipment and interior fittings. Concreting and modulation uses up 75 per cent of available labour, while the remaining quarter are involved in mixing concrete. This means about 6.35 million rural workers were involved in mixing concrete in 2001.

**Table 4.2 Impact on the Labor Input by an Increase in Use of Pre-mixed Concrete**

	Case 1 ( Same Utilization Rate of Pre-mixed Concrete )		Case 2 ( Continuous Increase of the Utilization Rate of Pre-mixed Concrete )		Difference on the Labor Input in the Concrete Mixing ( Case 1 – Case 2 )
	Utilization Rate of Pre-mixed Concrete	Total Labor Input in Concrete Mixing ( 10,000 )	Utilization Rate of Pre-mixed Concrete	Total Labor Input in Concrete Mixing ( 10,000 )	
2001	20%	635	20%	635	-
2005	20%	727	30%	712	15
2010	20%	866	40%	821	46

We learnt in Chapter 3 that 25 per cent of labour could be saved if pre-mixed concrete is used to replace on-site mixing. By 2010, the rate of utilization of pre-mixed concrete is expected to rise to 40 per cent from 20 per cent in 2001 (see Table 4.2), representing a reduction of 460,000 jobs assuming the construction sector grows at 8 per cent and other conditions remain unchanged.

***The effects of the shift towards using pre-fabricated products for interior fittings on employment***

Data provided by the China House Interior Fittings Association shows that 250,000 companies were specializing in this field in 2002. These companies employed 3 million labourers. In the study of Company A in Chapter 3, we found that 40 per cent of labour could be saved if pre-fabricated products were installed as opposed to preparing them manually on-site.

Table 4.2 shows, based on the assumption that the industry grows by 8 per cent and other conditions remain unchanged, that the utilization rate of pre-fab product will reach 70 per cent by 2010 compared with 30 per cent in 2001. This will represent a loss of 720,000 jobs from the labour force.

**Table 4.3 Impact on Labor Input by Increasing Use of Pre-fabricated Products in Interior Fitting**

	Case 1 Same Pre-fabrication Rate of the Products Used in Interior Fitting		Case 2 Continuous Increase of the Pre-fabrication Rate of the Products Used in Interior Fitting		Difference in Total Input ( Case 1 – Case 2 )
	Pre-fabrication Rate of the Products Used in Interior Fitting	Total Labor Input (10,000)	Pre-fabrication Rate of the Products Used in House Interior Fitting	Total Labor Input (10,000)	
2002	30%	300	30%	300	-
2005	30%	333	50%	303	30
2010	30%	394	70%	322	72

***Private sector to account for more and more contracted employees***

Employees in the construction sector will increasingly be working for non-public owned enterprises, Table 4.4 showing that the non-public owned economy will account for most jobs by 2010.

**Table 4.4 Forecast on the Employees of Construction Industry (10,000)**

Year	Public Owned Economy			Non-Public Owned Economy	Total
	State-Owned	Collective-Owned	Subtotal		
1980	674	237	911	0	911
1985	679	354	1,033	1	1,034
1990	575	357	932	2	934
1995	605	427	1,032	21	1,053
1996	595	412	1,007	28	1,035
1997	577	393	970	34	1,004
1998	444	311	755	92	846
1999	399	278	677	101	778
2000	372	261	633	111	744
2001	336	243	579	154	733
2002 (Forecast)	316	229	545	172	717
2003 (Forecast)	303	219	522	203	725
2004 (Forecast)	294	212	506	236	742
2005 (Forecast)	288	207	495	273	767
2010 (Forecast)	271	190	461	502	962
Final (Forecast) <sup>1</sup>	257	188	445	-	-

## **Chapter 5**

### **Conclusions and recommendations**

#### ***5.1 Results and analysis***

#### 5.2 Evaluations and issues regarding industrial policy

#### ***5.1 Results and analysis***

This section provides a summary based on the data and case studies examined

#### ***The construction sector is vital in providing employment for rural labour***

The construction sector has tended to require most labour amid the rapid development of China's economy and the reforms on the industry's recruitment practices. Urban employees have largely been employed in technical or management positions, while rural workers are largely involved in manual or semi-skilled work.

Employment in the sector can thus be divided into two clear categories: employees in the cities and rural workers who are hired on temporary contracts, allowing a good deal of flexibility for employers.

Rural workers are mainly supplied through construction brigades, a flexible yet relatively stable and secure channel for the labour supply subcontractors and enterprises. The quality of labour and labour market can be administered and managed more effectively using this form of labour supply by the authorities in overall charge of the industry.

#### ***Stagnant job growth in the construction sector***

Although the construction sector has recorded rapid growth since 1996, the size and scale of employment has not developed in a balanced way due to the reduction in urban employees and slow growth in the number of jobs for rural construction workers.

Analysis, case studies and policy review have revealed that the reduction in urban employees in the construction industry is largely due to reforms and restructuring of the state-owned enterprises and the recruitment system. Increasing mechanization and industrialization has eased growth in employment of rural workers. Major factors hitting rural workers in particular are the increase in use of pre-mixed concrete and expanding use of pre-fabricated products for interior fittings, which accounts for a reduction of around 25 per cent and 40 per cent in labour, respectively.

In spite of this reduction in labour, construction costs increase anyway, due to the increasing quantity of machinery required to produce pre-mixed concrete. Unless policies or regulations compel them to, construction enterprises do not opt to use pre-mixed or pre-fabricated products for interior fittings, although regulations are in place in Beijing, as mentioned previously.

### ***Employment forecast***

The number of urban employees employed in state-owned enterprises will continue to decrease and will then stabilize at about 4.45 million. Many of those departing will find opportunities for their skills in the growing private sector. Following a decline for several years, the number of urban employees in the construction sector is expected to grow this year, and in the longer term should reach 10 million by 2010.

On the assumption that the industry grows 8 per cent (per year) during the current decade and development of mechanization and industrialization remains at its current levels, the growth in employment opportunities for rural workers is expected to further decrease. By 2005, estimates see the number of rural workers at 33.56 million, rising to 39.81 million by 2010.

Should the utilization rate of pre-mixed and pre-fabricated products reach 40 per cent and 70 per cent, respectively, by 2010, 1.18 million fewer labourers would be required due to these factors.

## ***5.2 Evaluations and issues regarding industrial policy***

### ***Industrial policies need to be more employment-oriented***

Up until now, industrial policies in the construction sector have mainly been formulated from the perspective of the industry's development, focussing on:

- Enhancing technical aspects of the industry
- Improving labour productivity, and;
- Increasing enterprises' efficiency

This can be seen in:

- The reform of management in construction enterprises, as well as the introduction of a market mechanism in recruitment practices in the 1980s
- The reform of state-owned enterprises and adjustments to the qualification requirements adopted in the late 1990s, and;
- The promotion of mechanization and industrialization

These policies have had a negative effect on the potential for job growth and have had a negative effect on employment in the sector.

It is true to say that many good experiences have been accumulated with regard to reform of labour recruitment and policies in the construction sector. It is reasonable to point out that a flexible and reasonably secure system has been operating the provision of rural workers, representing a huge labour force. Policies have tended to focus on the growth of the construction industry rather than the creation of employment opportunities.

In 2001, labour supply subcontractor became a new category under the classification system in order to try and develop the construction industry labour market. Due to excessively high barriers and stiff criteria, labour supply companies have not matched expectations in terms of development. Many such companies seek a higher level license and there is a huge imbalance in the number of general contractors (30,000) compared with labour supply subcontractors (3,000). This is unlike normal business practice in the construction industry and so policies and regulations may need to be reassessed and adjusted accordingly by policy makers.

### ***5.3 Implications for future policy***

This study has been developed from a labour and employment perspective in order to analyze policy developments in the construction industry with a focus on the potential to provide more jobs for rural labourers, while trying to secure stable employment for urban employees. These represent a labour challenge in the construction sector.

With a massive oversupply of labour in China, the construction industry has a responsibility to employ masses of redundant workers, and so policies on the development of mechanization and industrialization should not focus predominantly on improving technical efficiency, but also give necessary consideration to employment during this period of sector growth.

Formulation of related policies should not only deal with industry-specific issues, but also cover issues such as how to handle the relationship between jobs and economic development, structural economic adjustments, deepening reforms, as well as economic development in urban and rural areas.

To evaluate the effects of the industrialization policy, which aims to enhance productivity, labour productivity should not be the sole evaluation criteria. Rather the methodology indicating production per total value of production, as promoted by the International Labour Office (ILO) should be utilized in an effort to stabilize or decrease the rate of mechanization to provide more employment opportunities for those unemployed and amid scarce resources in China.

In future, considerations should be given to maintaining some labour-based technologies in some construction processes in regions without sacrificing engineering quality or threatening the environment.

#### **The report recommends:**

#### ***Strengthening and deepening the administration of labour employment through the authorized agencies***

Policies in the construction sector must consider as high priority job-creation opportunities to move away from the current situation where government agencies in charge of construction are not involved in the management of labour issues, it is recommended that functions be added to the government agencies in charge of construction also oversee employment issues. This department should formulate and employment plans and policies and follow closely employment trends in the construction industry.

In terms of policy making for construction development, attention should be paid to the employment factors highlighted in this report, including:

### ***Developing Small- and Medium Construction Enterprises With a Focus on Labour-based technologies***

Small- and medium construction enterprises (SMCEs) are vital in generating employment opportunities, whether they be state- or non state-owned enterprises. Construction SMCEs can contribute to job creation through the use of labour-based technologies.

#### **The report recommends:**

- The government lower the standard set for machinery and equipment, particularly with regard to SMCEs
- That the SMCEs be highly competitive and cost effective
- That they be able to own appropriate tools for the requirements of their work
- That they shouldn't sacrifice on quality, and;
- That SMCE development should become a policy tool for the construction industry in small cities, towns and rural areas

In order to develop more SMCEs in the labour supply subcontractor category, requirements regarding number of employees, paid up capital etc should be further reduced. Construction Brigades should also be able to qualify to participate, while stress must be put on supervision, and enterprises that do not have the labour supply qualification yet operate in this area should outlawed.

Greater development of labour supply subcontractors should create greater stability in terms of the labour force and should enhance the workers' technical skills. The development of the labour subcontractors should be closely coordinated with efforts to establish supply bases in rural areas.

Labour brigades should get greater recognition and qualify for the status of labour supply subcontractor, as they have complied appropriately with relevant regulations in labour importing provinces. Criteria such as paid up capital, equipment restrictions and so on should be lowered under the classification of specialist contractor, and specialist contractors should be able to contract more kinds of projects to help develop small- and medium labour-based specialist subcontractors.

#### ***Adjustment to a range of mechanization and industrialization policies***

The major factor driving mechanization and industrialization of the construction industry is promote the industry's technological progress. However, such efforts should include the potential damage made in terms of social progress through such policies. The construction industry plays a huge role in alleviating the huge employment pressure in China.

Based on analysis within the report, ongoing policies regarding pre-mixed concrete and the use of pre-fabricated materials for interior fittings are the two biggest factors affecting employment in construction of residential buildings. Due to both technological and social implications, appropriate adjustments should be made in terms of the present levels of mechanization and industrialization.

In order to minimize inconvenience for buyers, it should be mandatory to use pre-mixed concrete in medium- to large-sized cities. This should not be mandatory, however, in smaller towns and rural areas where more workers could be hired without hitting costs.

We do not recommend that regulations be imposed nationwide preventing real estate developers and construction companies from selling homes without interior fittings pre-installed. This would prove counterproductive since at present small- and medium construction enterprises, which should be promoted, have a niche market. This may slow down the use of pre-fabricated interior fittings in large enterprises resulting in the hire of more labour.

### ***Reduce mandatory requirements on machinery and equipment***

The excessive requirements presently placed upon construction equipment under current classifications should be reduced, while the equipment leasing business should be promoted and developed. By encouraging leasing, construction enterprises are not forced not invest a large amount and can spread the payments. This ensures they are financially able to secure stable employment.

### ***The development of non state-owned enterprises***

Privately-owned construction enterprises will one day provide the most opportunity for employment, as the reform and restructuring of state- and collective-owned enterprises intensifies.

Local governments should be encouraged to further implement privatization of small- and medium-sized state-owned enterprises. The market competition mechanism should prove to be perfect in breaking the protection of traditional state-owned enterprises by local government and government agencies. Privately-owned construction enterprises should be treated equal in all aspects of the bidding process, and with regard to administrative permits, rewards and awards.

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