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CONSTRUCTION INDUSTRY RESOURCE REQUIREMENTS

Abstract

In Sri Lanka, the construction industry is in an upward trend and therefore it has become an attraction among all local and foreign investors. With the end of the ethnic conflict, the situation supports a sustainable economy and resulted in lots of infrastructure construction developments. Many number of construction activities are now implemented, especially in the North-East area. In meeting the above goals, numerous challenges that are to be overcome have been identified. The industry concerns rally round shortage of skilled craftsmen, high raw material costs, lack of availability of funds, lack of lands for housing in urban & suburbans, low supply of quality materials and standards, specifications, frequent changes in legislation, lack of development plans etc. At the same time competition of other Asian countries to hunt the foreign investment opportunities resulting low FDI's, reluctance in sharing latest technical innovations by them and migration of construction workers, generate certain threats to the industry. In addition to above, lack of information on construction industry of Sri Lanka, non-availability of best practices of procurement strategies, and globalization of construction industry also have become issues to be addressed.

Therefore, it is required to establish suitable preventive and corrective actions to enhance the sophisticated levels to ensure the availability of key industry resources for the betterment of the construction industry of Sri Lanka. This paper discusses four main challenges identified and issues to be addressed by the Sri Lankan construction community to take necessary pre arrangements such as development plans.

1.0 Background

Sri Lanka is an island country located approximately 32km away south easterly of India and at the tip of the Asian Continent, with a land area of 65,610 square km (sq.km). In 2013, the country had an estimated population of 20,483 million with an annual growth rate of 1 per cent. Since its independence in 1948, Sri Lanka had remained unstable politically and socially because of a long civil war and terrorism between the majority group of Sinhalese (75%) and the minority group of Tamil (15.4% Sri Lankan & Indian Tamil) until the 25-year-long domestic strife ended in May 2009.

With the aim of sustaining over 8 per cent GDP growth rate in the next 10 years, the Government of Sri Lanka has laid emphasis on less developed regions, rural livelihood, infrastructure and reconstruction in all over the island focusing more on conflict zones which underwent a devastation during the 30 year old ethnic unrest. Several plans and strategies announced by the Government indicate that the country's construction industry is poised for significant growth because of investments in sectors such as power, roads, ports transportation, housing, tourism and reconstruction.

It is estimated that the construction industry is the 3rd largest industry in the country. However, the recent past has seen this industry going through a lot of dynamic changes. These changes reflect the aspirations of the private sector to promote the construction industry as a properly regulated industry, and the government's efforts, to promote and regulate the growth of the construction industry. The end of the island's ethnic conflict in 2009 has revived the economic activity and resulted in a strong focus on infrastructure development. The country's construction industry contributes to about 8 % to the country's

GDP, with growth since 2003. In 2014 1st quarter, Sri Lanka's construction industry recorded a growth rate of 22.5 % as compared to 5.6 % in 2009. Its contribution to the GDP was about LKR 890 billion, at current prices.

Acceleration of ongoing projects such as for development of power sector including mega projects, road development including expressways and port city developments is likely to generate large demand for companies in the construction industry. This upsurge is attributed to the freedom for growth experienced by all sectors in the country resulting from the eradication of terrorism. In this post-conflict situation the long suppressed buoyancy of the construction sector was released and it was able to record many important milestones. In the economic front, the per capita income was doubled over the last five years to US \$ 2,900 per year, graduating the country to the middle income category of countries with an emerging market economy. The spare construction capacities and resources in some bigger Asian countries such as China & India have been directed to stable countries like Sri Lanka contributing heavily to the capital influx in this country. The property boom and large investments in infrastructure projects across the country grew out of this backdrop. With strong capital inflows, prevailing deregulatory policies, globalization of capital markets, such construction bursts are inevitable in investor hospitable countries. This trend is more common in the leisure cum tourism sector, attracting global big time investors to friendly investing environments.

The property development sector which is presently quite dynamic, can be expected to continue to experience this boom due to the unfulfilled demand. This volatility however may diminish in the future with supply meeting the demand. Nevertheless there is growing evidence that economic recovery had entered a more positive phase from the first and second quarters of 2010 and was able to sustain building foreign investor confidence. The growth of the economy remained strong, averaging 7.5 per cent per annum, during the period 2010 to 2013.

1.1 Development Plans in Construction Sector

Some construction projects implementation performance has not been up to expectations reflecting slow progress. This shows some implementation problems which are attributed to procedural delays and lack of coordination on the part of public sector executing and implementing agencies. Therefore it is necessary to strengthen the project implementation and monitoring capacity of Sri Lanka.

Weak monitoring and evaluation, project ownership, capacity of the executing and implementing agencies, social and environmental resistances, delay in loan effectiveness, procurement and use of consultants, annual budget and release of counterpart funds, delegation of authority, political interference and inadequate communication coordination and civil unrest, land acquisition and re-settlement related issues are the key underlying causes contributing to delays in project implementation. These general problems, which are common to most regional countries, have adversely affected the implementation performance of projects. Effective monitoring and evaluation systems, with early warning signals and alerts to the project management and concerned decision makers, will enable timely corrective action, avoiding time and cost overruns.

Therefore, it is required to pay attention on development plans that sets out the development goals and objectives of the construction industry as identified by the government and a strategy for achieving these development goals and objectives.

2.0 Industry Resources

Construction Industry resources are identified as inputs that are used in construction of infrastructure facilities, housing, public buildings and utility facilities. The main resources are identified as;

- (1) Human resource
- (2) Construction Materials and components
- (3) Technology development
- (4) Investment

In Sri Lanka, the tantalizing issues concerning the resource usage are lopsided towards Human Component of the sector. Although there are sufficient skills development avenues generously funded by GOSL and other Donor Agencies, the attraction towards the Industry has painted a bleak picture continuously indicating a vigorous downturn in meeting local and foreign demands.

Lack of regulations in supply chain network of construction material and components and due to the quite slow nature of introduction of innovative materials and construction methods, etc, to the industry, have been inimical for a true dynamism in the industry. Slow growth in technology transfers in FDIs and other Donor Funded projects has reduced equitable sharing of global technological advances and their applications in raising the standards of the industry. Influx of foreign labour and deployment of expatriates for funded projects have equally contributed to confounded domestic conjunction.

In addition, there has been no strategic consideration in mitigating environmental impacts to the industry conceptualizing the entire world as a single global village maintaining cordial relationships among the regional countries in the least. In combating the threat of climate change, many nations in the region are operating in a similar paradigm and developing countries are less committed to share their resources. In this context, Sri Lanka stands in a low profile to reap the benefits.

Lending small and medium Contractors and entrepreneurs in the construction sector is treated in a low priority by most of the financiers in Sri Lanka. Presently 95% of Construction Contractor population is represented by these S & M categories. Due to the risks associated with the industry and frequently reported delays in payments by the clientele has been a bane to the expected growth in this sector. Urbanization followed by scarcity of lands for housing is another burning issue dealing with basic needs of the population.

2.1 Human Resource Requirement and its Contribution to the Industry

2.1.1 Background

Construction industry contributes 7 per cent to the total of employment out of an average contribution of 27% to the whole industry sector. As of 2013, the direct employment in the construction industry was half a million persons. This included four categories of employees : professional (consultants, engineers), technical (supervisor, foremen), skilled craftsman (masons, carpenters etc) and tradesman (Construction machine operators, mechanics). They are supported by the unskilled workforce. Almost 97 per cent of total persons employed were males with 75 per cent falling in the 25-45 age-group. 52 per cent were with experience of less than five years.

Much investment has also been committed by the stakeholders to update technology, capacity, resources in production, processing and distribution, including improving the quality and skills of the construction labour force.

A national strategy to develop human capital for the contemporary construction Industry looking for high levels of skill is a demanding task. In order to popularize the attraction to the trade the public and private sector education and vocational training institutions have to modernize their training to acceptable levels to meet these emerging requirements. In order to achieve this, specially the craftsmen segments of NVQ level 3 & below, the Government has a programme to work in partnerships with industry and training providers. It is aimed at working towards a common goal by formulating and implementing policies in consultation with all stakeholders, and regulators to establish a quality assured and labour market oriented system that fulfils socio-economic goals of Sri Lanka.

The Government's development policy statement "*Mahinda Chinthana - Vision for the Future*" spells out its intention of expanding and improving quality and relevance of vocational education system by capacity building and upgrading training facilities. Two key policy objectives related to Vocational Training in this important Policy document *are* :

- (1) Increasing enrolments in Vocational training institutions (increase enrolment rate of public training institutions to 20% by 2013 and 30% by 2016), and
- (2) Improving operational and managerial efficiency of such institutions dedicated for training.

According to the 2013 Labour Market Information Bulletin (LMIB) published by the Tertiary and Vocational Education Commission (TVEC) of Sri Lanka, 66.5 % of unemployed population is without any vocational training. In numbers it amounted to 229,161 in that year. According to the same TVEC reports, the job demand in craft & related work categories in the Construction Sector recorded a substantial 3.3% , amounting to 3590 from a total demand of 107,698. In comparison, the demand of same level craftsmen indicated in second and third places which represented by Manufacturing and Leisure sectors, recorded figures as low as 2.1% and 2.2% respectively. Therefore the policies and strategies to meet this increasing trend shall include plans to enroll school leavers and other youth who are presently attracted to non productive segments.

Foreign employment placements in two major craftsmen categories of Masonry Technician and Electrical Technician have come down considerably recording more than 40% drop

mainly due to the increased demand in the local scene. In 2013 foreign job placements for Mason, Plumber & Electricians were less than 25% of orders showing a strong local demand.

As a promotion to attract more and more youth to the industry, a national rewarding scheme themed “Mahabhimani” has been arranged beginning from year 2013, by the Ministry of Construction, Engineering Services, Housing and Common Amenities of Sri Lanka, along with the industry regulating body Institute for Construction Training & Development (ICTAD) and National Construction Association of Sri Lanka. It was started with the goal of promoting youth from island wide to enter into the industry and encourage skills enhancement among construction workers, who are already in the trades.

The GOSL along with its Vocational Training arms, has identified a set of occupations that need to be developed in the country for smooth functioning of the industry. In fact, there are several new occupations that have emerged and need skill training to be developed for better servicing of the industry and since such skills are presently not available in the country. It can be clearly observed there is huge demand for construction craftsmen and present supply does not cater to rising demand. This situation has aggravated to such an extent that labour importation seems a viable option.

Increased Annual Demand for Construction Craftsmen from 2011 to 2016, as per the Technical, Vocational , Education & Training (TVET) plan of TVEC for the year 2007, can be predicted as below. This illustration can also be used to identify the popular categories and their degree of involvement in the industry.

Occupation	Year	2013	2014	2015	2016
Masons		4,763	5,001	5,251	5,514
Carpenters		2,363	2,481	2,605	2,735
Plumbers & Pipe Fitters		762	800	840	882
Electricians		707	742	779	818
Bar Bender & Steel Fixers		361	379	397	417
Painters		399	419	440	462
Tile Layers		399	419	440	462
Scaffold Fixers		180	189	198	208
Plasterers		1,347	1,415	1,485	1,560
Concrete Workers		1,936	2,033	2,134	2,241
Shuttering Workers		11	12	12	13
Aluminum Workers		31	32	34	36
Total		13,258	13,920	14,616	15,347

2.1.2 Foreign Demand for Skill Construction Craftsmen

Data collected from Sri Lanka Foreign Employment Bureau on the vacancies received from foreign countries (demand) for construction industry craftsmen and the departures to accept those vacancies (supply) shows mix results during past few years. In some cases the demand for construction sector employees increased heavily, while some segments decreased. However the demands have not been met in any segment during the past.

2.1.2.1 Vacancies and Departure on Construction Craftsmen Abroad

Occupation	2010		2011		2012	
	V	D	V	D	V	D
Bar Bender	197	124	108	10	217	95
Building Carpenter	626	166	1690	344	740	227
Carpenter –Joiner	4896	1349	1688	373	69	13
Carpenter Shuttering	1570	362	1447	171	701	75
Building Electrician	221	39	452	208	270	65
Plumber	-	-	621	70		
Mason-General	7564	2333	5211	1013	3173	602
Mason-Tile Fixer	1625	683	835	328	419	73
Scaffolder	231	18	487	16	200	61
Painter-Building	238	42	145	51	187	101
Total	17,168	5,116	12,599	2,585	5976	1312

(Source: SLBFE, 2012)

To satisfy this new and further training needs, public and private institutions should work hard and achieve expected goals. In addition to the local requirement, there is a foreign demand for construction workers, which amounts to an average of 15,000 annually.

2.1.3 Recommendations to develop Human Resource Capabilities and Capacities in the Construction Industry

2.1.3.1 Promote and Enforce Use of Skilled Labour

Productivity, quality, sustainability and innovation are becoming driving forces for the Sri Lankan construction industry. Hence, development of human resource capabilities has become a necessity. Labour intensiveness and current practice of employing unskilled labour has restrained productivity growth in the sector. Low wage rates in the industry have reduced the incentive to use new construction technology and methods. Thus, in order to enhance productivity and performance, it is necessary to promote and enforce the use of skilled labour.

TVEC in association with the Skills Development Project (SDP) funded by the Asian Development Bank (ADB), introduced the national certification system for the TVET sector of Sri Lanka, which is called the NVQ framework with effect from January 2005. The prime objective of NVQ framework is to facilitate the manpower skill development in the industry.

Meanwhile, the global demand for skills and training has continued to rise, reinforcing the role of productivity and innovation as key determinants of long term, international competitiveness. Several scholars have identified positive correlation between labour productivity levels and skill intensity in studies conducted to highlight the linkages between skills, innovation, and productivity. The findings have also highlighted that experienced

employees and fresh graduates were key drivers of innovation. By promoting the use of academically qualified professional team and skilled labour force, the Sri Lanka construction industry could improve its image, which would make it easier to attract more qualified professionals and skilled workers to raise performance of the industry. An improvement of general skill levels in the industry will further increase the likelihood that new technologies and methods will be adopted and this would strengthen the industry's competitive position. Many countries including UK, USA and Singapore have also stepped up their efforts in promoting the skill levels and encouraging "multi-skilling" of their construction workforce.

The Sri Lankan construction industry can promote the use of skilled labour by adopting following approaches to human resource development;

- Assessment of the human capital need,
- Initiate skill development, training and education,
- Encourage continuous skill development programmes.

2.1.3.2 Assessment of Human Capital Need

ICTAD can play a vital role in information gathering and analysis for the assessment of required skills by collaborating with professional bodies, industry associations and contractors. It is necessary to conduct a comprehensive assessment of the industry's present and future needs. Results of the study would be stored in a skills database managed by ICTAD. A forecasting mechanism must also be developed to predict skill requirements based on proposed future development projects.

2.1.3.3 Skill Development, Training and Education

ICTAD can use NVQ framework in developing skill standards for the construction industry. Human resources for the construction industry formally acquire competencies by attending training courses conducted by organizations such as ICTAD, Technical/University Collages, NAITA, to name a few. However, in order to ensure the quality of training and enhanced performance, there is a need to establish a construction training academy under ICTAD to develop trainers, monitor training centers and to conduct research in collaboration with national universities.

Individuals entering the construction industry would be required to equip themselves with the required competency levels to perform a particular trade. These skills and knowledge can be acquired from various ICTAD accredited training centers. It is, therefore, important that a standard training curriculum is developed for these training centers to produce a competent workforce for the construction industry.

Another means of encouraging human resource development in the industry is to make it compulsory for construction companies to take in qualified apprentices and skilled workers. Further, ICTAD can include this requirement into contractor grading mechanism.

2.1.3.4 Encourage Continuous Development Programmes

In addition to the competency acquired, the practice of continuous development for construction workforce at all levels should be emphasized as continuous improvement in their

skills and knowledge is necessary to keep abreast of the latest technology development in construction.

2.1.3.5 Nurture the Desire to Work in the Construction Industry amongst the Local Workforce

Nurturing a desire amongst the local workforce to enter the construction industry is imperative for the survival of the industry. The current reliance on unskilled labour cannot be sustained given the future direction of the country.

The government recognized that in order to sustain economic growth, increased international competitiveness, and to meet the objectives of Mahinda Chintana – The Way Forward, it must pursue the development of a knowledge hub. The construction industry needs to move away from traditional methods and promote new construction technologies and practices. The knowledge and skill sharing with foreign workers is also identified as a method of enhancing the skills of the local workforce.

The impact of a potential skill shortage is a severe issue which is not unique to the Sri Lankan construction industry. Difficulties in meeting client requirements on time and loss of business to competitors due to lack of labour force and skill shortage, were highlighted by many construction companies. Currently, the construction industry experiences a boom where companies find it difficult to find required labour force to satisfy the demand. Frequent hiring and training of workforce adds a heavy burden on the industry.

Improving the attractiveness of the industry will help sustain human resource capacity by improving human capital retention. If the industry can successfully improve the image of the industry to attract more local workforce, it can also address the issue of skilled human capital retention. Improving the industry image and sustainability will help to retain this critical group of workforce.

A potential candidate can enter the local construction industry as an unskilled, semi-skilled or skilled worker. The following recommendations will focus on attracting workforce for the local construction industry.

2.1.3.6 Target Potential Workers during Tenure in Schools

One of the main sources of labour for the industry will be new entrants, those who have just completed secondary education. The industry should target this group before they complete their schooling. Targeting potential workers during their tenure in schools will help to increase the likelihood of them joining the construction industry.

Focused efforts to promote the construction industry to this group of potential workers would include participation in career fairs, exhibitions and direct contact at schools along with an intensive nationwide advertising campaign. A comprehensive promotional programme is necessary to counter the perception of construction as a "Dirty, Dangerous, Difficult" industry and also to promote it as a rewarding employment with attractive prospects. It is also imperative to introduce a compulsory pension scheme as a retirement plan for the sector allowing the employees to reap benefits at their feeble times.

2.2 Construction Material Resource Requirement

Construction industry depends on mainly materials and equipment, labour, finance and time constraints. Among above key performance factors, construction material available today spread in a broad spectrum of varieties, specifications, standards and market prices. Therefore, the diversity of the construction material industry is complex and difficult to analysis. As per the survey carried out by Department of Census and Statistics on construction industry in 2010 to identify the input, output and trends on construction materials on various fields, (such as building, highway, bridge, water supply and drainage, irrigation and land drainage and dredging and land reclamation) the sector's average value of raw materials used with compared to the total value of contract is 21% for the year 2010. That means approximately 21% of contract value is spent on construction materials. However, it reflects only the information gathered from contractors registered with ICTAD.

2.2.1 Share of Foreign suppliers for construction materials

It is revealed that value of cement used by the Building industry is higher than the other sectors and Road sector which had used sand, rubble and metal has high total value with compared to the other construction sectors. Expenditure for construction materials used by highway sector is higher than all the other sectors and it is 47% of total expenditure for construction materials used by the construction sectors.

Table 2.1 : Construction Material Imports

Category	Value in Rs Million				
	2009	2010	2011	2012	2013
Building Materials	75,290	92,905	118,935	157,437	175,054

However, the ability to fulfill the construction material demand in the industry is not supplied by the local industry. Only a certain percentage of total construction materials is produced in Sri Lanka and the cost of construction material imports during the last 5 years is shown in the Table 2.1. Growth in government housing programmes was also reflected by the movement of the import volume index of building materials which grew by 11.9% per cent. According to the Table 2.1, the value of imports is about Rs Million 175,054 for the year 2013, indicating that foreign importers have significant role in our construction projects and housing units.

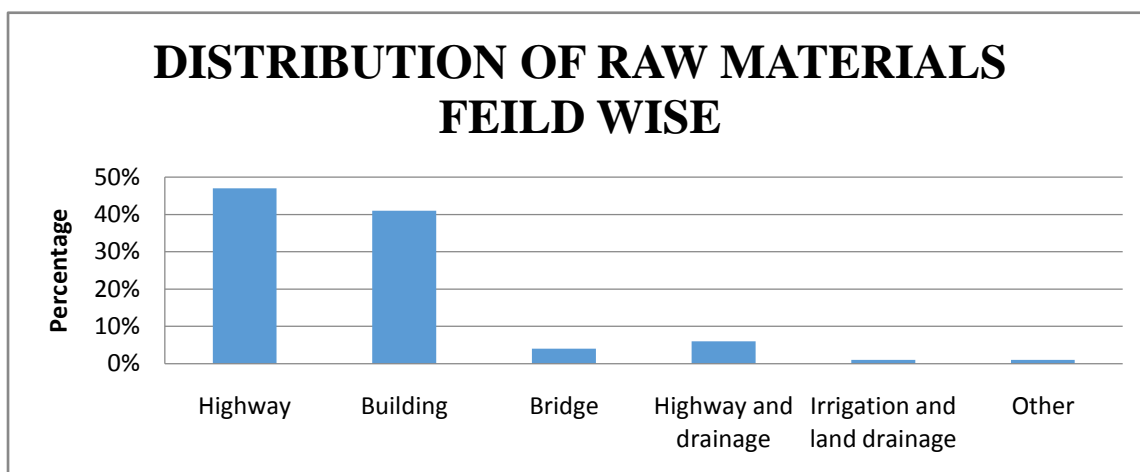


Chart 2.1: Distribution of raw materials according the value among the construction fields

Among locally manufactured construction materials, bricks, lime, sand, quarry products, soil, asbestos sheets are the most important. There are relatively few large industries for manufacturing construction materials in the private sector as well. However, the production is not satisfied to fulfill the industry requirement. Cement, Asbestos Cement Products, Upvc pipes, roofing sheets, electrical wires, sanitary fittings and paints are among products manufactured by these industries. A part of the requirement is imported from countries such as India, Pakistan or Europe. Especially, cement, Asbestos roofing sheets, Zn/Al roofing sheets, Tiles etc.

Geographical conditions of Sri Lanka is basically supports for an economy based on agriculture than the industrial oriented economy. Raw materials such as clinker, iron ore, coal, limestone, silica and aluminum are not the indigenous resources found in Sri Lanka and therefore a vacuum in construction raw materials is generated. However, it is required to establish a equilibrium between the imports and use of local materials. As such, it is necessary to increase the share in the consumption of indigenous resources based materials produced in locally and using local raw materials and labour. Balance demand is assumed to be imported. This is a means of overcoming the foreign exchange constrains that operates on the construction sector. This strategy represents an integrated and balanced approach to the utilization of resources available in a developing country diverting to a practice of both labour and capital intensive techniques.

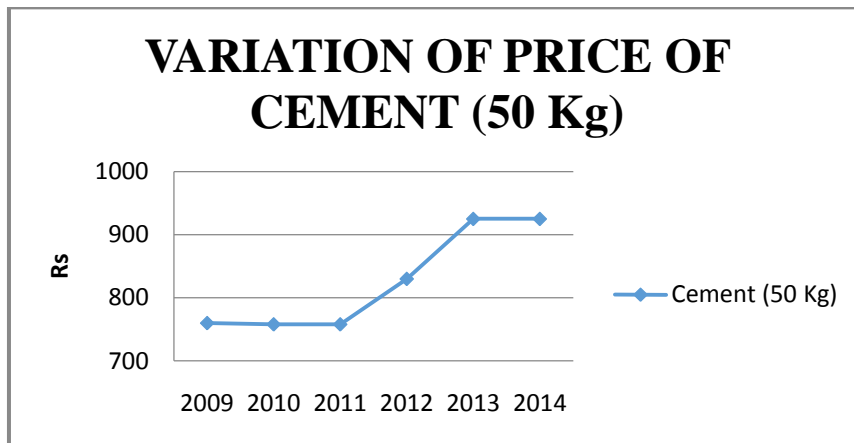


Chart 2.2 : Variation of price of cement

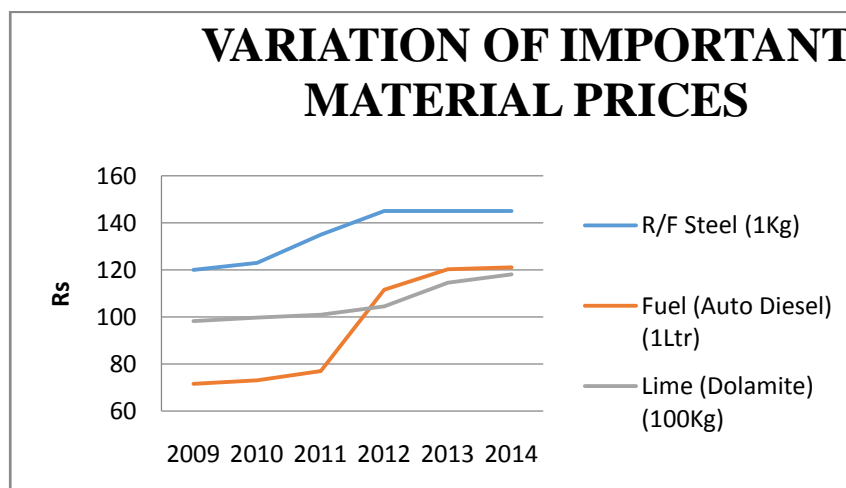


Chart 2.3: Variation of price of other important material

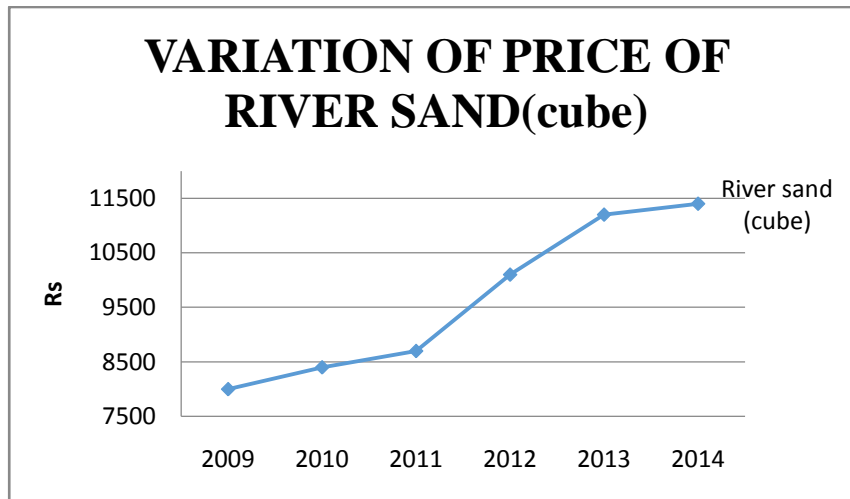


Chart 2.4: Variation of price of river sand

Production of construction material has been inadequate due to a number of constraints. Procurement of various inputs including raw materials, fuel and finance for production is problematic. Due to competing uses, availability of fuels like coal, firewood or straw and high price of electricity is becoming a serious constraint. In urban areas, industrial space for storage of raw materials and the stipulated guidelines are critical issues.

As per the Chart 2.2 & 2.3 price of cement and other related construction materials have recorded a continuous increase over the last decade. In the year 2009, the cement price was around Rs 750.00 and for the year 2014, it is recorded as Rs 950.00. However, with the burst of the global commodity price and general slowdown in the economic activity have been occurred and the prices have been stabilized during the last two years. Therefore, construction sector could be expected to benefit from stabilized price levels in the short term.

As of June 2013, the price of a cube of sand was over LKR 11500.00 and the price of a cube of river sand can be sold up to LKR 15000.00-17000.00 in certain instances. The heavy rain and the swelling of waterways have made sand mining difficult and prices to escalate. This can be clearly seen from the Chart 2.4.

In addition to that the new products may be considerably more expensive than the traditional materials in comparable usage. Economic evaluation is not conducted properly. At the same time, the labour cost also makes a high impact on the production process which has been significantly increased during the last 3-4 years.

2.3 Technology Resource Requirement

The context of the built environment is becoming more complex and therefore, quality management in a construction project is of utmost importance to upgrade the architectural appearance, improve safety and durability of the building and to ensure user compatibility. In terms of safety, structures should be able to withstand both natural and manmade disastrous situations. Good built space for living, working and other activities is of high demand.

Increasing treats to natural environment need more attention. Time, quality and cost are becoming key factors in the any production cycle including in the construction process. The final product has to fulfill the needs and aspirations of the user to occupy the building without any difficulty.

Current situation of Technology transfer on quality management and modernization efforts must show respect for national development, employment and income redistribution strategies. There had been little change in the existing technology as well as little success with attempts to modernize made by the relevant authorities, in pursuit of the technology transfer with compared to global technology. Among major short comings is lack of investment, non availability of suitable plant and equipment at an affordable cost and insufficient training programmes for both personnel of the promoting institutions and the managers and craftsmen of these enterprises are significant.

ICTAD as the government body to standardize the construction industry has introduced many number of specifications for various construction fields. Specially, buildings, highways and water supply etc. But, there is a requirement of developing specifications for construction requirements such as construction materials and components and construction work.

Sri Lanka Standards Institution (SLSI) is a key institution in Sri Lanka, under its responsibilities to develop and implement standards for manufacturing sector including the construction industry. SLSI has standards for construction materials as well as on measurements in construction industry. Institutions like Urban Development Authority (UDA) in Sri Lanka, is responsible for physical development and plays a key role in this area in urban context in construction of buildings and surrounding environment. However, despite of all standards available, there are many numbers of forged, poor quality construction materials and components in the market. Therefore, there is a national need of formulating a quality controlled construction material manufacturing/import industry and building codes in order to develop and improve quality standards of construction sector in Sri Lanka. For this, building codes covering all the aspects of the industry such as design, construction, maintenance etc. would be much useful in achieving the desired results in the act of building.

The construction industry of Sri Lanka is extremely in need of information for more effective and efficient out comes. Levering on information would enable the construction industry to improve its performance achieved by numerous other industries. Therefore, the construction industry needs a single point of access to all information, a 'knowledge hub' relevant to the industry very soon to compete with the global parallel competitors.

2.3.1 Technology as a resource for proper waste management in the Construction

Waste management has been a number one attention of in any industry with the scourge of pollution and recent global climatic and ecological concerns affecting the whole environment, setting no boundaries for destruction. Waste is, to a certain extent, inevitable on construction sector and this is an additional cost involved in construction. Further it creates an economical and environmental harm and health issues. In general, it is found that the wastage of important construction materials

such as cement, lime etc. are as follows ;

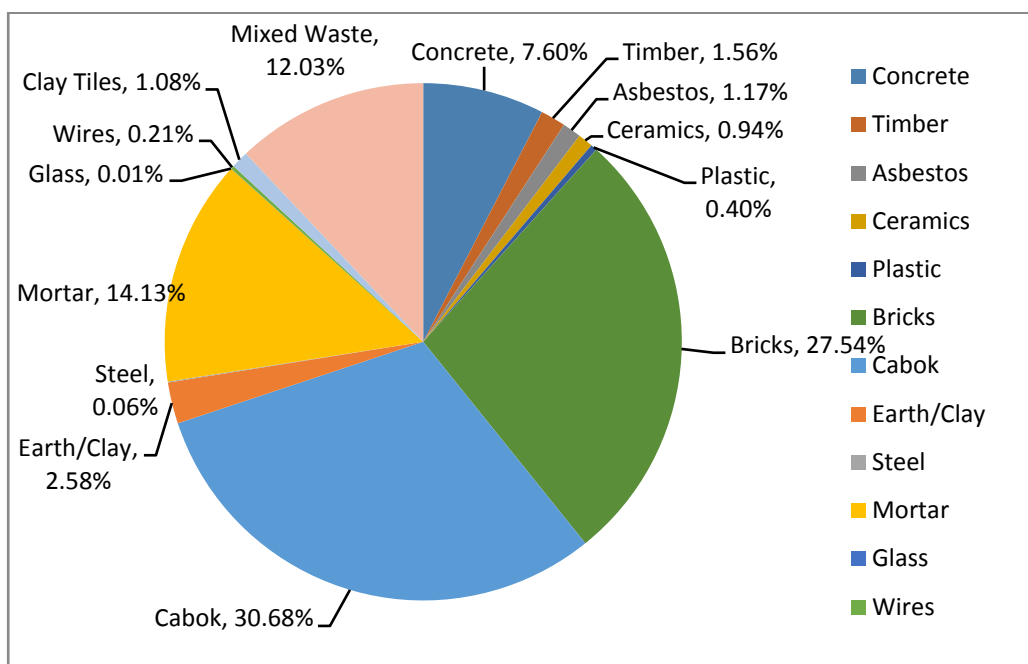


Chart 2. 5: Composition of Demolition Waste in Sri Lanka

A huge quantity of construction material is being wasted during the processes of demolition, delivery, stockpiling, cutting and fixing. Sri Lanka does not have regulations specifically designed for construction waste disposal. Even the general regulations devoid of penalties/incentives. Therefore, implementation of these regulations has many number of barriers. Further, there is no identification of land spaces for waste, disposal charges, disposal factor and percentage of waste with compared to construction cost.

The concern of recycling the waste in cities particularly in Colombo Metropolitan Regions is very high. Further, in Sri Lanka there is no proper Guidelines stipulated by the Municipal Councils on recycling and depositing. Therefore it is of paramount importance to tap technologies such as Crushing and reusing that are already being implemented in the neighboring countries. Since China and South Korea have been venturing in many projects here in Sri Lanka, focus shall be made on agreements on transferring such mechanisms at reasonable costs or as part of the overall funding structure.

2.4 Financial Resource Requirement

Poor availability of funds remains a serious concern for the industry. ICTAD as the government apex body to regulate the construction industry implements a process of grading construction contractors and according to several industry experts, the important reason for a majority of the contractors to remain below the boundaries of C1-C3 grades are poor access to sources of funding. The Chart 2.6 shows the number of registered contractors with respect to the grade as at 30th September 2014. It can be seen that the number of contractors registered under Grade C7 is 1208 who have the financial strength that limited to Rs 1.0 M. Even for Grade C6, the number of registered contractors is 444 which the financial capacity is only Rs 2.0 M.

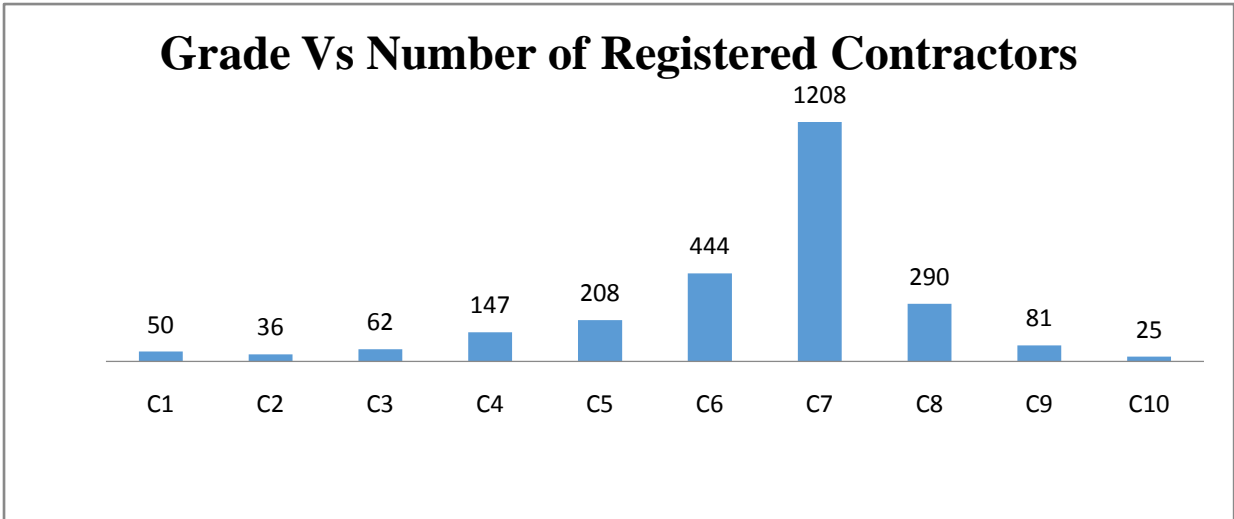


Chart 2.6 : No of Registered Contractors with ICTAD

This is because many of the large scale construction projects are Government initiated and many contractors often face delays in receiving payment from such projects. As a result, the sub contractors and other entities face financial difficulties, which adversely impacts suppliers of materials and ability to scale up. Payment concerns needs to be addressed by arranging specialized financial assistance aiming at development of the industry.

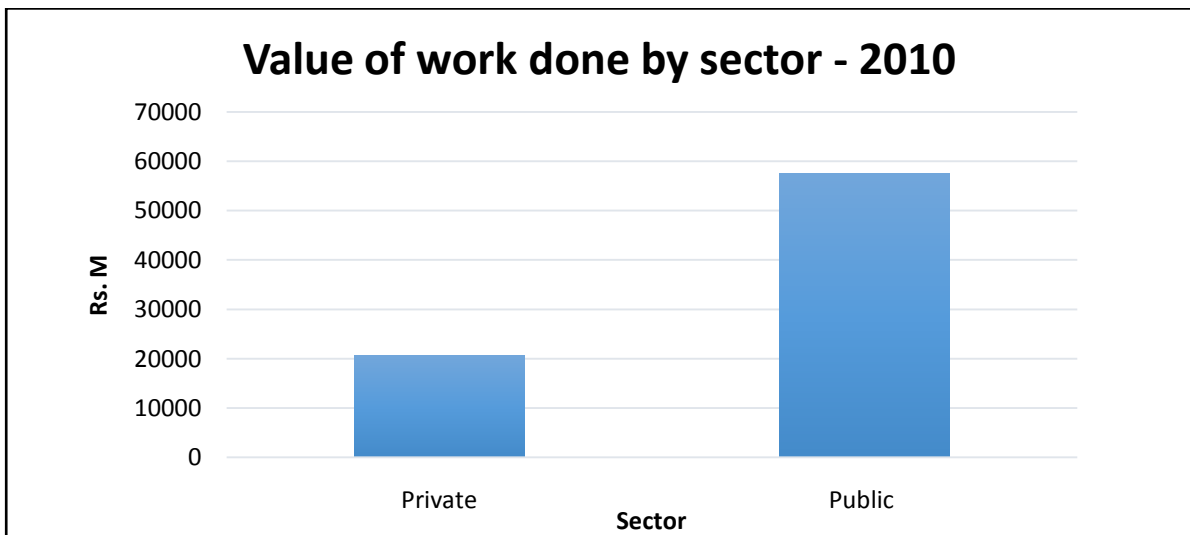


Chart 2.7: Distribution of value of construction work by the sector

As per the Central Bank Report, 2013 it is noted that private sector involvement in housing development projects was reflected by 9.1% growth in loans and advances for the housing sector by commercial banks while the public sector was also involved in housing development projects such as 'Jana Sewana' housing programme focusing more on rural housing development.

Land acquisition is a preliminary task in construction related development projects. Specially, for proper highway network, to expand the existing roads and construct new roads, highways and expressways, private lands in both sides of the roads are to be acquired. However, a number of projects have been delayed on account of delays in acquisition of land and other issues of resettlement and rehabilitation. In addition to that finding lands for Housing in urban areas is a challenging task. At the same time metropolitan areas such as Colombo 01, where there are many State & Private sector enterprises, including warehouses that date back to the island's former Colonial era when the lake was used to transport goods from the Colombo port, has been identified as a night-life tourist spot, under the Colombo City beautification programme. Meanwhile, the Galle Face area of Colombo 02 has also been earmarked for further tourism development . Therefore, within Colombo suburb area the price of a perch of a land varies from LKR 900,000.00 - 13,500,000.00.

Therefore, It is required to obtain the maximum support of the public for acquiring lands without delay in order to develop roads. To minimize the loss by granting a fair compensation for the acquired lands is a key function here and proper mechanism of handling such grievances should be established in order to minimize the delay in at least large, loan based infrastructure projects proposed.

It is estimated that the construction investment on urban development and housing in the year 2015 would be LKR. 150 Billion. Out of this only 32% would be provided by the government and it is assumed that the balance would be undertaken by the private sector. Therefore, foreign investments are considered to be vital in securing a sustainable growth in the sector. It is required to introduce attractive incentives and conducive policies while development policy regulations and approval procedure should also be streamlined for this sustenance. During the next five years period, in Power, Roads, Ports and Transportation sectors, there is an investment requirement of LKR 3226 Billion. The projects are expected to be funded both by the government and foreign development partners. It is estimated that Sri Lanka needs to build 100,000 houses per year nation-wide until 2020 to cover the housing demand.

3.0 Recommendations & Conclusion

In order to have sufficient human resources for future needs, the construction industry must collaborate with academic institutions to revitalize interest in construction-related courses. The construction players can work with academic institutions to enhance the curriculum in construction-related fields. This can be done by updating the curriculum to make the material taught and skills learned more relevant to the industry needs. A coordinated effort should be undertaken by ICTAD to establish a formal dialogue with academic institutions to establish and revise the relevant curriculums. Skilled plant and equipment operators and skilled labors are increasingly sought after by foreign construction companies severely impacting the current local workforce. Therefore, it should to be taken into consideration the need to produce more professionals and skill workers considering the skill migration to foreign construction industries. In addition, a mechanism to attract women to skilled trades such as electrical and plumbing needs to be considered since demand in the garment industry is diminishing. The construction industry could further boost exposure to working in the industry by encouraging industrial placements (internships) for students. On the job training should be considered for skilled based trades. By encouraging industrial placements, companies can better ensure trainees will acquire specific skill sets that enhance their value for employers.

Regulation mechanisms in construction material supplies will ensure stability in upstream and downstream channels in the total supply chain. GOSL, along with its regulating arm ICTAD, shall introduce a Material Supplier registration system, in order to monitor this vital segment. Initially this scheme may be introduced as a voluntary mechanism, which can be promoted to be attracted by suppliers. As a penultimate marketing strategy, the outcome could be used for further strengthening of the system.

Boosting of FDI's and bilateral agreements of Technology Transfer mechanisms in funded projects will be the key success factors of strengthening the technology resource enhancements. Sri Lanka should use the maximum opportunities and obtain these benefits through the upcoming mega projects such as the Port City Development and the Super Highway Construction project.

Financing and providing adequate land for housing and other infrastructure projects are identified as priority areas in the policy development framework of the government. In keeping with these, the government should arrange a pathway to facilitate the construction community with low interest loans, leasing systems, insurances and other tax concessions with the aim of increasing number of investors in the field.

The 20th Asia Construct Conference

Country Presentation

Sri Lanka

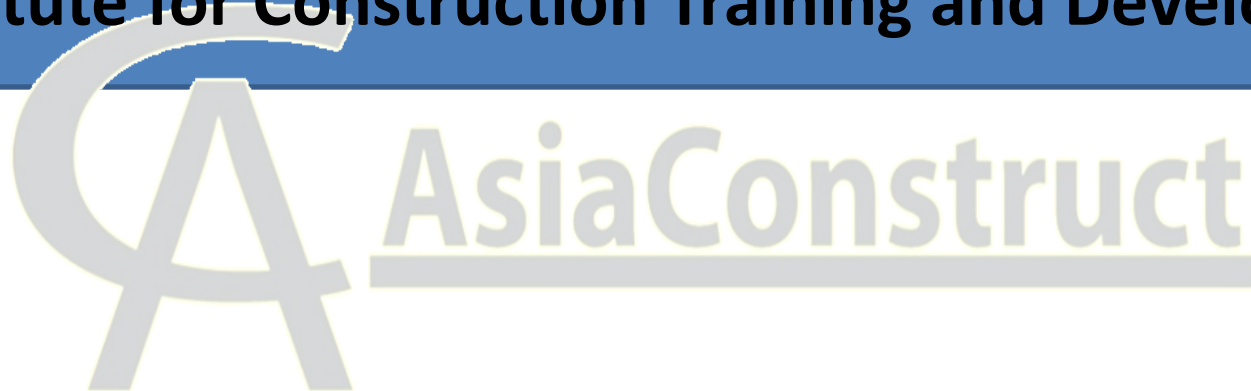
13- 14 November, 2014

HONG KONG

Arch. H K Balachandra
Director General

Eng. S K S Amarasekera
Director (Development)

Institute for Construction Training and Development



Sri Lanka

Located at the southern tip of India
South Asia

Income level Lower middle income



GDP (current US\$)
\$67.18 billion 2013

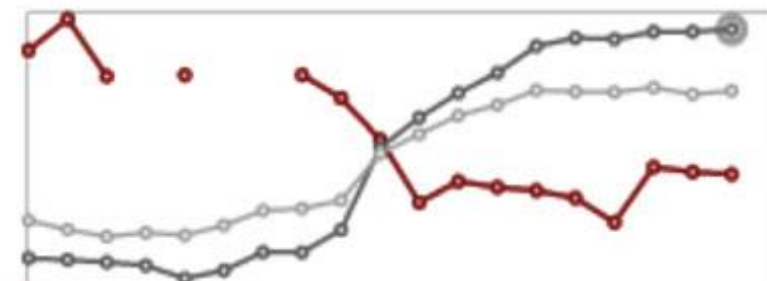
Population total
20.48 million 2013

Land area
65,610 square km
(sq.km)

Sri Lanka - Development Indicators

School enrollment, primary (% gross)

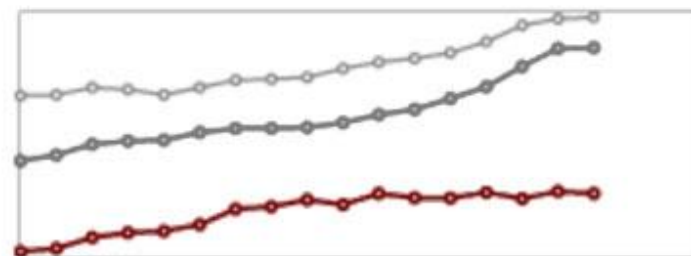
98% 2012



■ Sri Lanka ■ South Asia
■ Lower middle income

CO2 emissions (metric tons per capita)

0.6 2010



■ Sri Lanka ■ South Asia
■ Lower middle income

Sri Lanka - Development Indicators

Poverty headcount ratio at national poverty line (% of population)

6.7%	2013
8.9%	2010
15.2%	2007
22.7%	2002
28.8%	1996

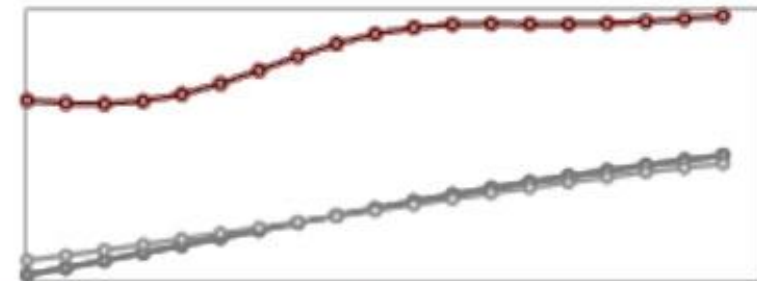
Improved water source, rural (% of rural population with access)

93%	2012
92%	2011
90%	2010
89%	2009
87%	2008

Sri Lanka - Development Indicators

Life expectancy at birth, total (years)

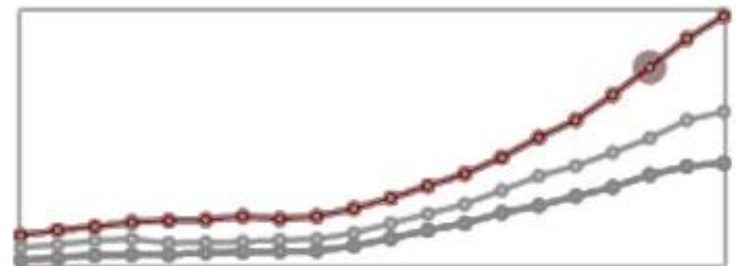
74 2012



■ Sri Lanka ■ South Asia
■ Lower middle income

GNI per capita, Atlas method (current US\$)

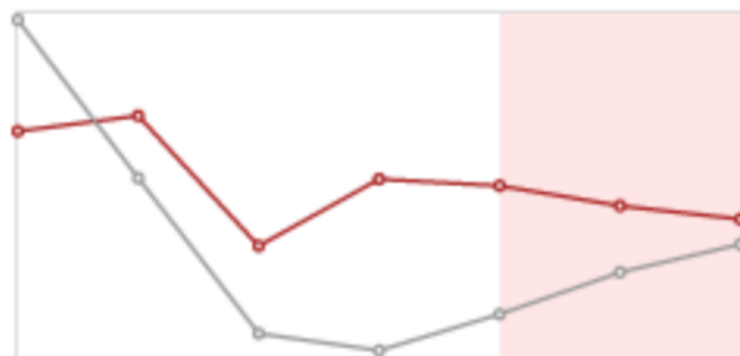
\$3,170 2013



■ Sri Lanka ■ South Asia
■ Lower middle income

Sri Lanka - Development Indicators

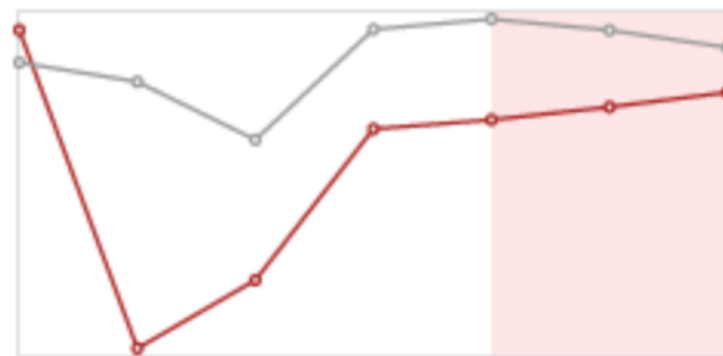
Annual GDP Growth (%)



■ Sri Lanka ■ South Asia

Forecast (2014, 2015, 2016)

Current Account Balance, %GDP



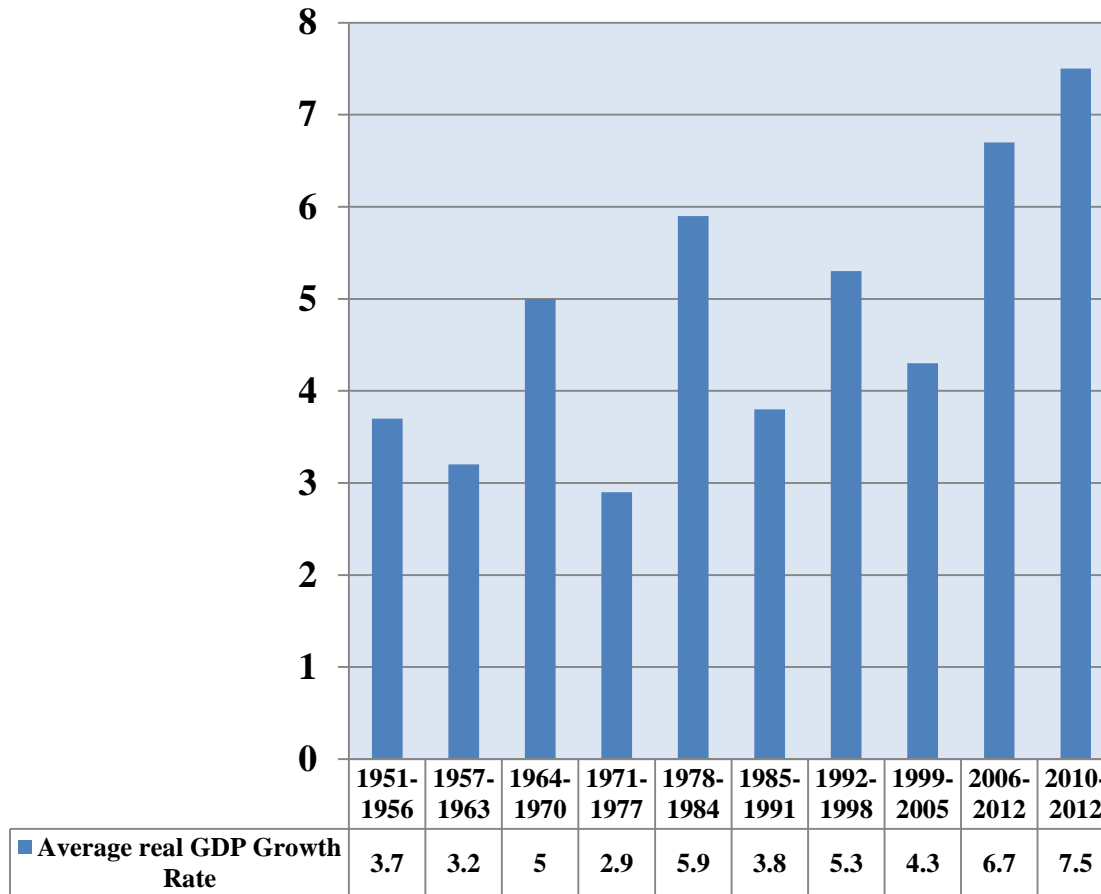
■ Sri Lanka ■ South Asia

Forecast (2014, 2015, 2016)

REAL GDP GROWTH RATE

Economy grew at a rapid phase after 2010

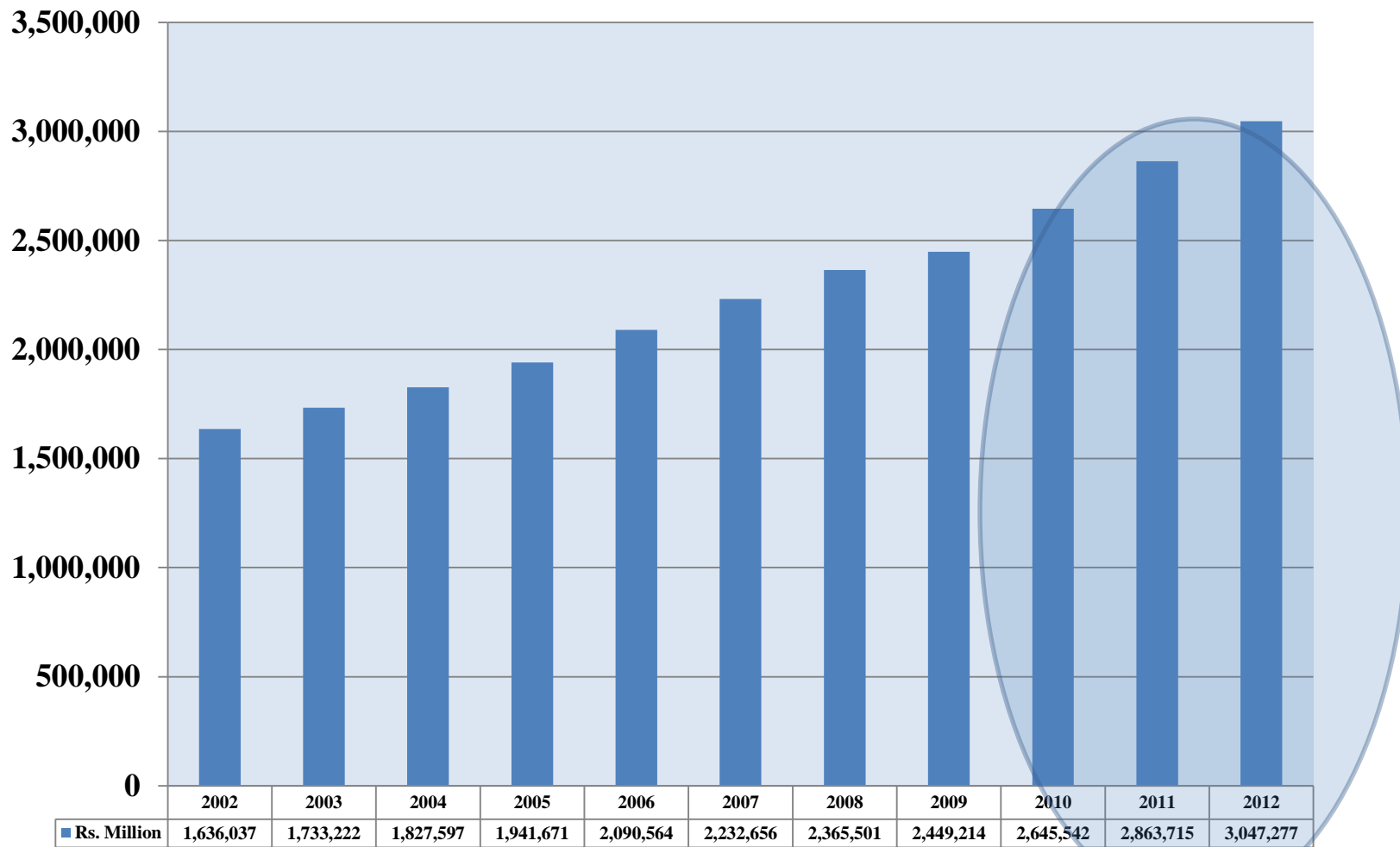
Real GDP Growth - Period Averages



Period	Average Real GDP Growth Rate
1951-1956	3.7
1957-1963	3.2
1964-1970	5
1971-1977	2.9
1978-1984	5.9
1985-1991	3.8
1992-1998	5.3
1999-2005	4.3
2006-2012	6.7
2010-2012	7.5

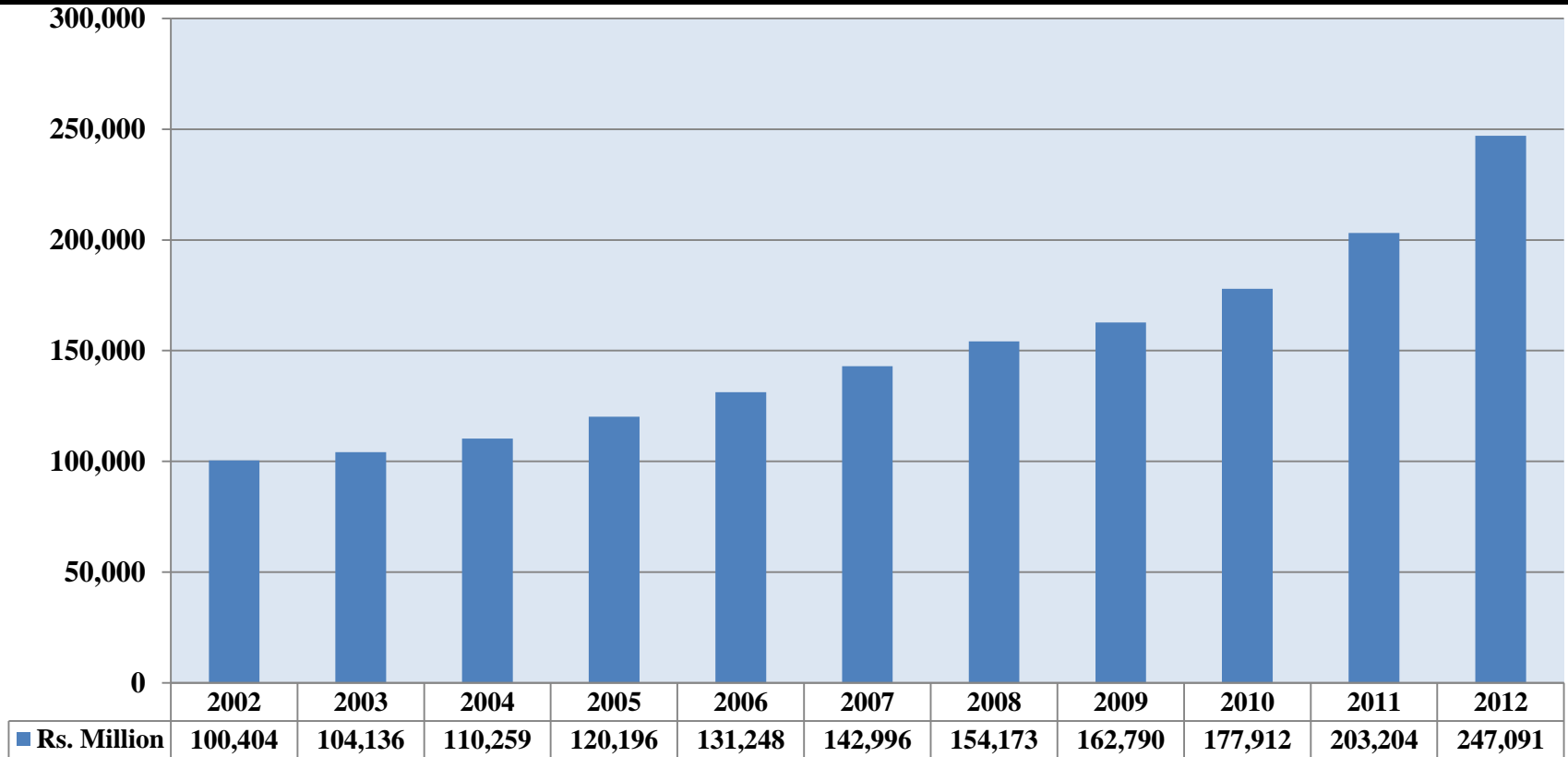
The average post independence growth rate was 4.5%
 Economic growth averaged an impressive 7.5% in post conflict
 three year period from 2010 to 2012

GROSS DOMESTIC PRODUCT AT CONSTANT PRICES



This high growth was underpinned by the conducive macro economic environment, strong domestic demand, improved investor confidence, continued expansion of infrastructure facilities and improved doing business environment amidst the fragile global economic recovery.

VALUE ADDITION BY THE CONSTRUCTION SECTOR TO GDP



Construction Sector has become a major value additor to the GDP mainly due to the implication of major infrastructure development projects such as expressways, highways, international ports and airports and housing schemes under the Janasevana Programme.



Multi purpose tower

Southern highway

This massive growth was underpinned by the mega infrastructure development projects implemented by the Government and the increased investments by the private sector developers, particularly on hotel and housing construction

Mattala air port

Katunayake expressway

Hambantota port





Mega housing projects implemented under the Janasevana Programme and private sector investments specially on apartment complexes increasingly contributed to achieve this unprecedented growth In the construction sector

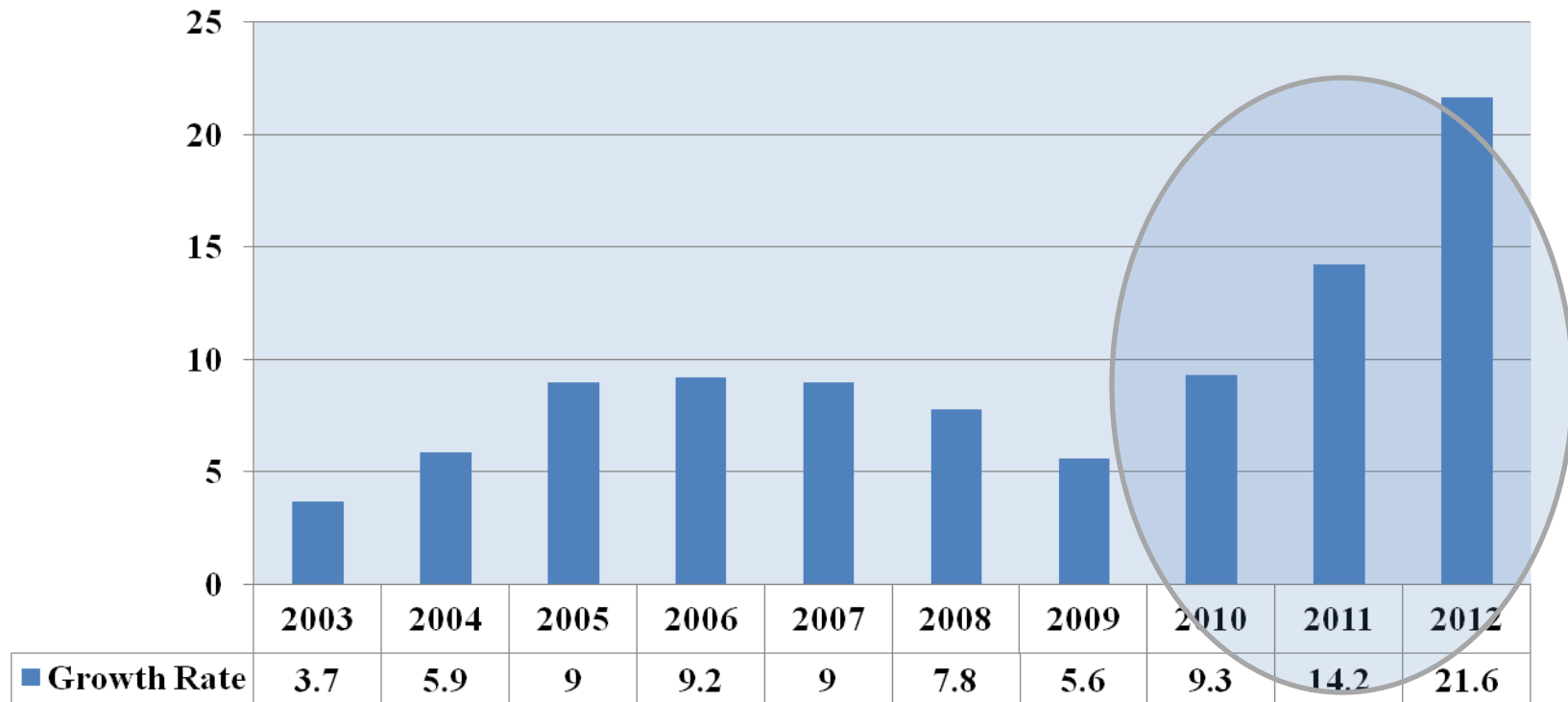


Transformation of the urban human settlement landscape



GROWTH RATE OF CONSTRUCTION INDUSTRY AT CONSTANT PRICES

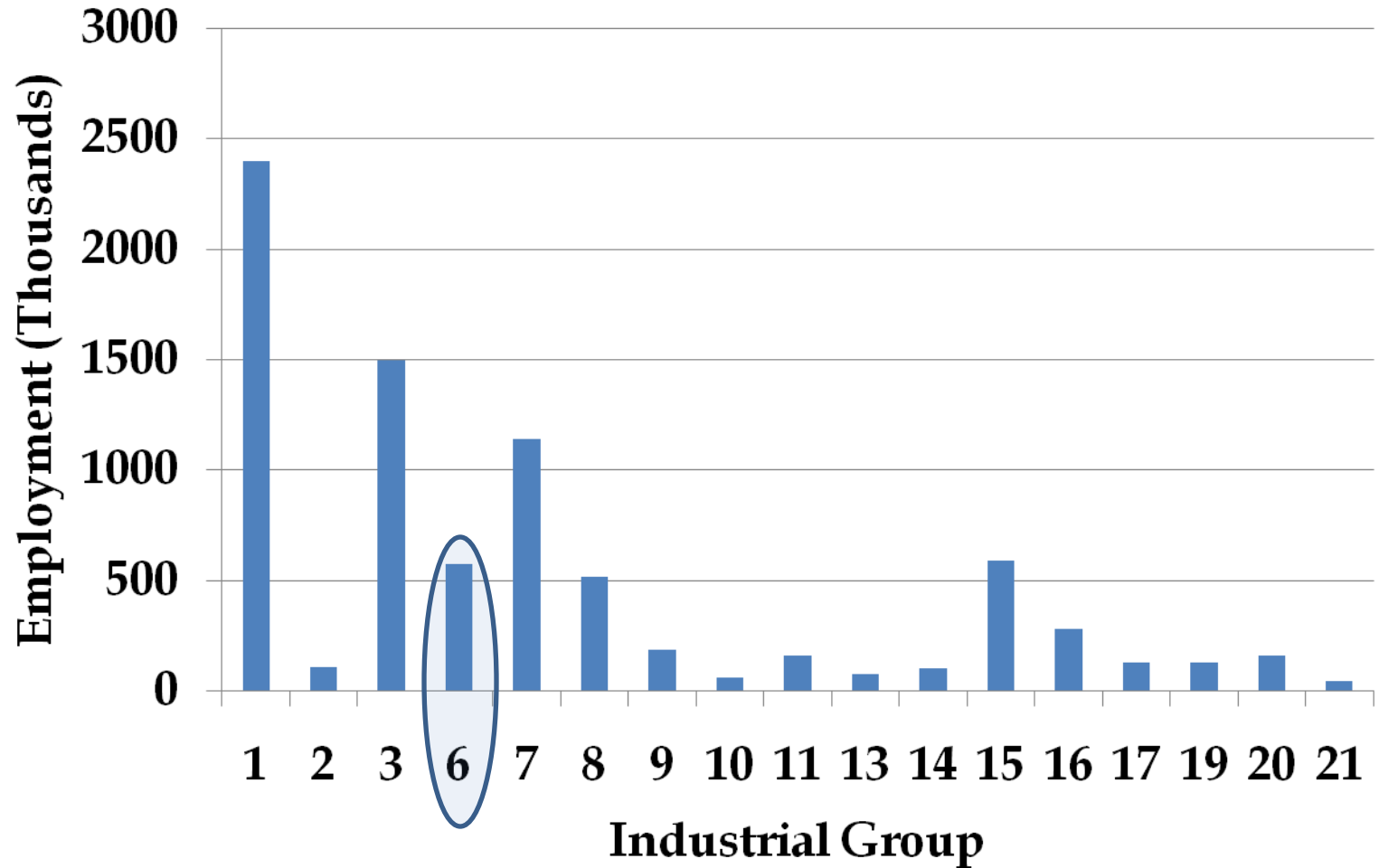
This is the first time in the post independence history that construction sector has realized a growth rate of over 21%.



Construction Sector has recorded an impressive growth rate continuously after the year 2010 due to the

- Visionary policies of the Mahinda Chinthana future vision.
- Rapid implementation of those policies by the Ministry under the committed leadership of the Hon. Minister of Construction Engineering Services Housing and Common Amenities.
- Eradication of three decade long conflict.

Employment by Selected Industrial Groups



Construction sector generates employment for over six hundred thousand people

Specialty vs No. of Contractors - 2014

Specialty	No of Contractors in 2014	% per Total Contractors
Building Construction	2555	99.57%
Highway Construction	2477	96.53%
Irrigation & Land Drain	2379	92.71%
Water Supply & Drainage	2368	92.28%
Dredging & Reclamation	2296	89.48%
Bridge Construction	2004	78.10%
Storm Water	190	7.40%
Groynes & Revetments	61	2.38%
Other Heavy Construction	1	0.04%
Total Contractors	2566	

CONSTRUCTION INDUSTRY DEVELOPMENT ACT

The new Construction Industry Development Act will make provisions for development and upliftment of the Construction Industry.

The major features of the Act :

- Establishment of the national advisory council on construction
- The establishment of the Construction Industry Development Authority
- The establishment of the Construction Industry Development Fund
- To provide measures for the improvement and well being of the industry related professionals, manufacturers, suppliers, contractors and craftsmen.

Resources constrains for the sustenance of the emerging growth

- **Skilled Labour :**

The scarcity of skilled professionals in the sector is one of the main challenges faced by local contractors. Less than five percent of construction workers in the country have been systematically trained and carry certificates that are indicative of their skill. Therefore, it is imperative that the government and the industry join hands and initiate an island-wide construction worker skill development programme via technical colleges to develop a strong structural base for the Sri Lankan Construction Industry through manpower training and development.

Shortage of skilled labour :

- The composition of the GDP has shifted from agriculture to industry and services sector.
- Agriculture share of GDP declined from 20% to 11%.
- Share of the industry has increased from 27% to 33%.
- School curriculum technical education and vocational training programmes have not evolved adequately to meet changing demands, resulting in a large skill gap and mismatch in the local labour force.
- Lack of adequate skill is one of the major constraints in operating and growing business, third only to tax and regulation.

- Sri Lanka has the most educated work force in South Asia with 87% of citizens completing secondary school.
- It's workforce is not equipped with right skill to become Machine Operators, Mechanics, Technicians etc.



- There must be an integral approach to skill development focusing on developing critical technical and soft skills demanded by the market.
- Technical and vocational education training programmes should be developed for active participation in industry players and become more demand driven and diversified.
- The potential for enterprises based training should be explored.

Current employment

Industrial Group	2008	2009	2010	2011	2012
Construction sector	7.4	7.3	7.0	6.9	8.1

Demand for occupations in the construction industry

Annual demand for construction craftsmen from 2011- 2016 can be predicted as given below :

Occupation	2013	2014	2015	2016
Masons	4,763	5,001	5,251	5,514
Carpenters	2,363	2,481	2,605	2,735
Plumbers & Pipe Fitters	762	800	840	882
Electricians	707	742	779	818
Bar Bender & Steel Fixers	361	379	397	417
Painters	399	419	440	462
Tile Layers	399	419	440	462
Scaffold Fixers	180	189	198	208
Plasterers	1,347	1,415	1,485	1,560
Concrete Workers	1,936	2,033	2,134	2,241
Shuttering Workers	11	12	12	13
Aluminum Workers	31	32	34	36
Total	13,258	13,920	14,616	15,347

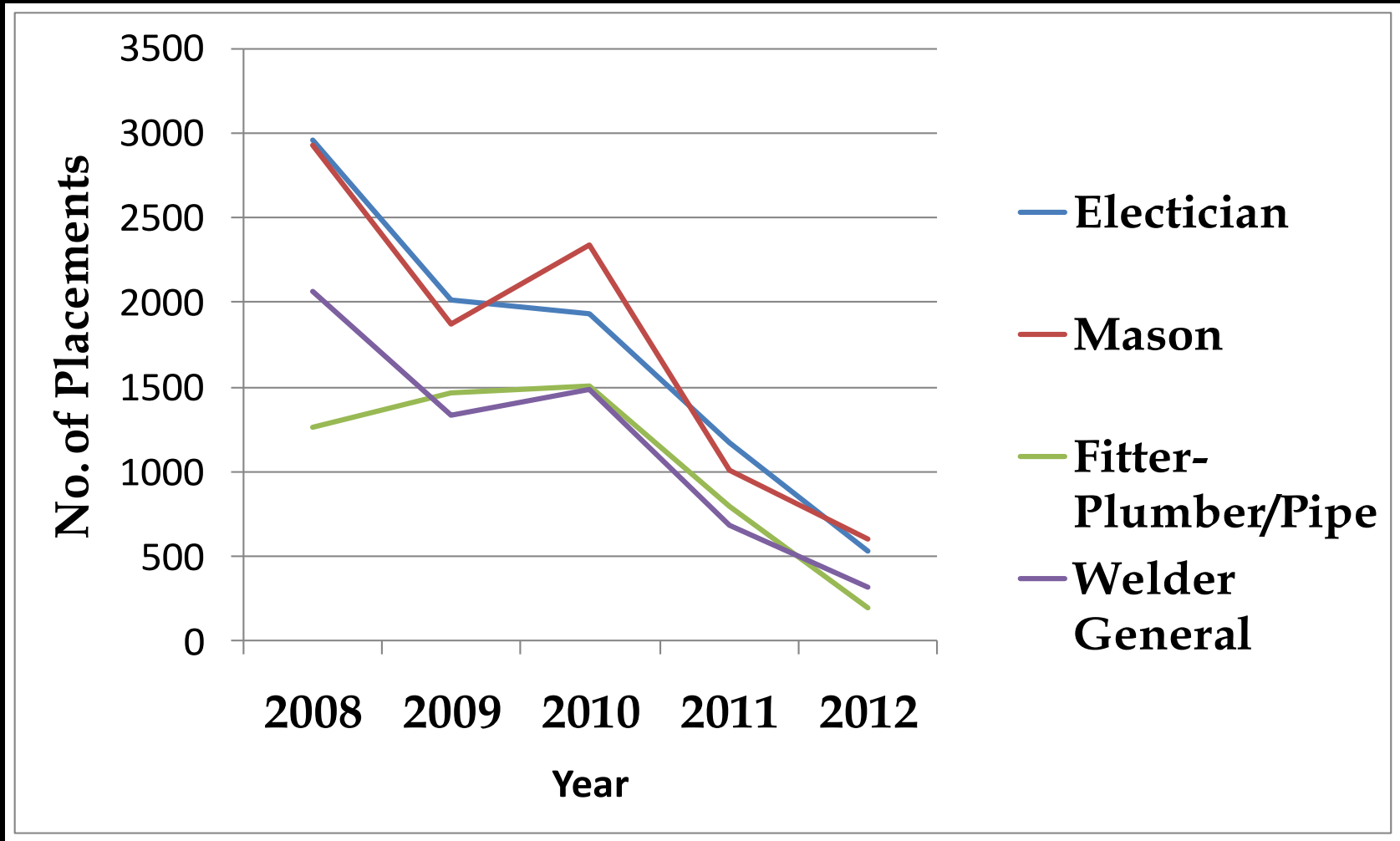
Almost 97% of total persons employed were males with 75% falling in the 25-45 age-group. 52% were with experience of less than five years.

Modernize their training to acceptable levels to meet these emerging requirements.

Foreign employment placements in two major craftsmen categories of Masonry Technician and Electrical Technician have come down considerably recording more than a 40% drop.



Trends in Selected Crafts & Related Worker Jobs



Considerable decline can be observed in foreign employment placement due to the employment opportunities created by the massive emerging growth in the construction sector .

Reluctance of young generation to join the Construction Industry

The image of industry :

The construction industry has been classified as a 3D industry (Dirty, Difficult, Dangerous)

It is required to transform the industry image from 3D to 3P. (Professional, Productivity and Progressive industry)

Recognition and rewarding of construction craftsmen “Mahabhimani”

It was started with the goal of promoting youth from island wide to enter into the industry and encourage skills enhancement among construction workers, who are already in the trades.

MAHABHIMANI 2013

Jointly organized by
ICTAD and NCASL



More than 6000 craftsmen participated enthusiastically for
craftsmen assessment programme conducted island-wide

MAHABHIMANI 2013

*Jointly organized by
ICTAD and NCASL*



Construction Craftsmen were nationally rewarded by the Head of State giving them the dignity and pride identifying their sustained contribution for the uplifting of quality and productivity

MAHABHIMANI 2013

*Jointly organized by
ICTAD and NCASL*



Best Craftsmen of the island in the respective trade nationally recognized and rewarded uplifting their social image

Recommendations to develop Human Resource Capabilities and Capacities in the Construction Industry

Promote and Enforce Use of Skilled Labour

- The Government of Sri Lanka has recently enacted a new Act of Construction Industry Development.
- Under the provisions of this Act all the construction craftsmen working in the field of construction should have the Identity Cards indicating their levels of competency and skills.
- Those Craftsmen who have been in the field without any formal vocational training, obtain these Identity Cards proving their skills at the assessment conducted by the Construction Industry Development Authority (CIDA) under the RPL assessment system.
- NVQ qualifications will be made mandatory for the craftsmen going abroad to work as construction craftsmen.

Quite slow nature of introduction of innovative materials and construction methods

The supply of energy to the increasing demand is becoming more and more serious

The building sector consumes 40% of energy emitting 30% of green house gases

It is increasingly required to introduce environmentally friendly technologies encouraging the use of renewable energy sources leading to the substantial reduction in energy usage and demand

Sharing of knowledge and transferring of technologies in the field of energy conservation and use of renewable energy is very appropriate at this juncture

Slow growth in technology transfers in FDIs and other Donor Funded projects has reduced equitable sharing of global technological advances and their applications in raising the standards of the industry.

Inadequate system for financing of contractors

Fiscal measures to be extended to contractors

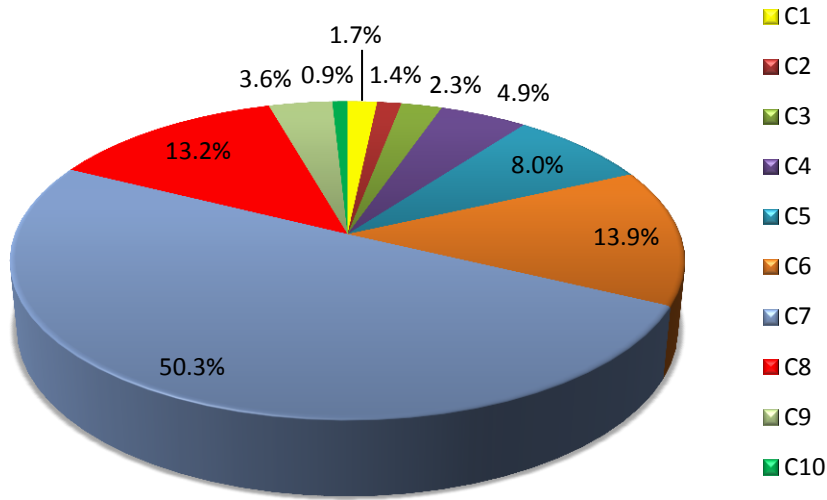
Small and medium Contractors and entrepreneurs in the construction sector is treated in a low priority by most of the financiers in Sri Lanka. Presently 95% of Construction Contractor population is represented by these S & M categories.

Due to the risks associated with the industry and frequently reported delays in payments by the clientele has been a bane to the expected growth in this sector.

Commercial banks should take meaningful steps for equip themselves to be able to efficiently apprise the need to finance construction contracts in respect of project financing, re-scheduling of outstanding loans and reduction of interest to comparable rates.

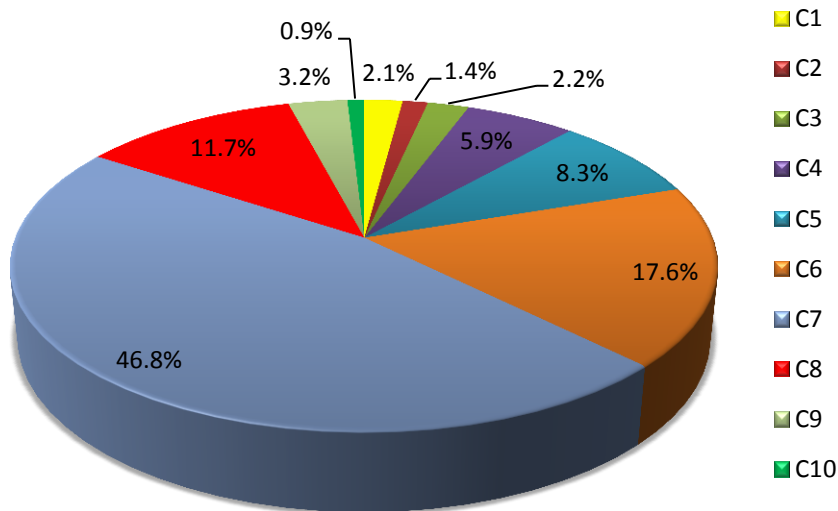
Inadequate access to the financial resources

Composition 2013



Most of the contractors falling in to the category of small and medium scale have very limited access to the loans and other financial requirements due to their incapacity to submit the elaborative securities and guaranties required by the financial institutions.

Composition 2014



This is because many of the large scale construction projects are Government initiated and many contractors often face delays in receiving payment from such projects. As a result, the sub contractors and other entities face financial difficulties, which adversely impacts suppliers of materials and ability to scale up. Payment concerns need to be addressed by arranging specialized financial assistance aiming at development of the industry.

Construction Material Resource Requirement

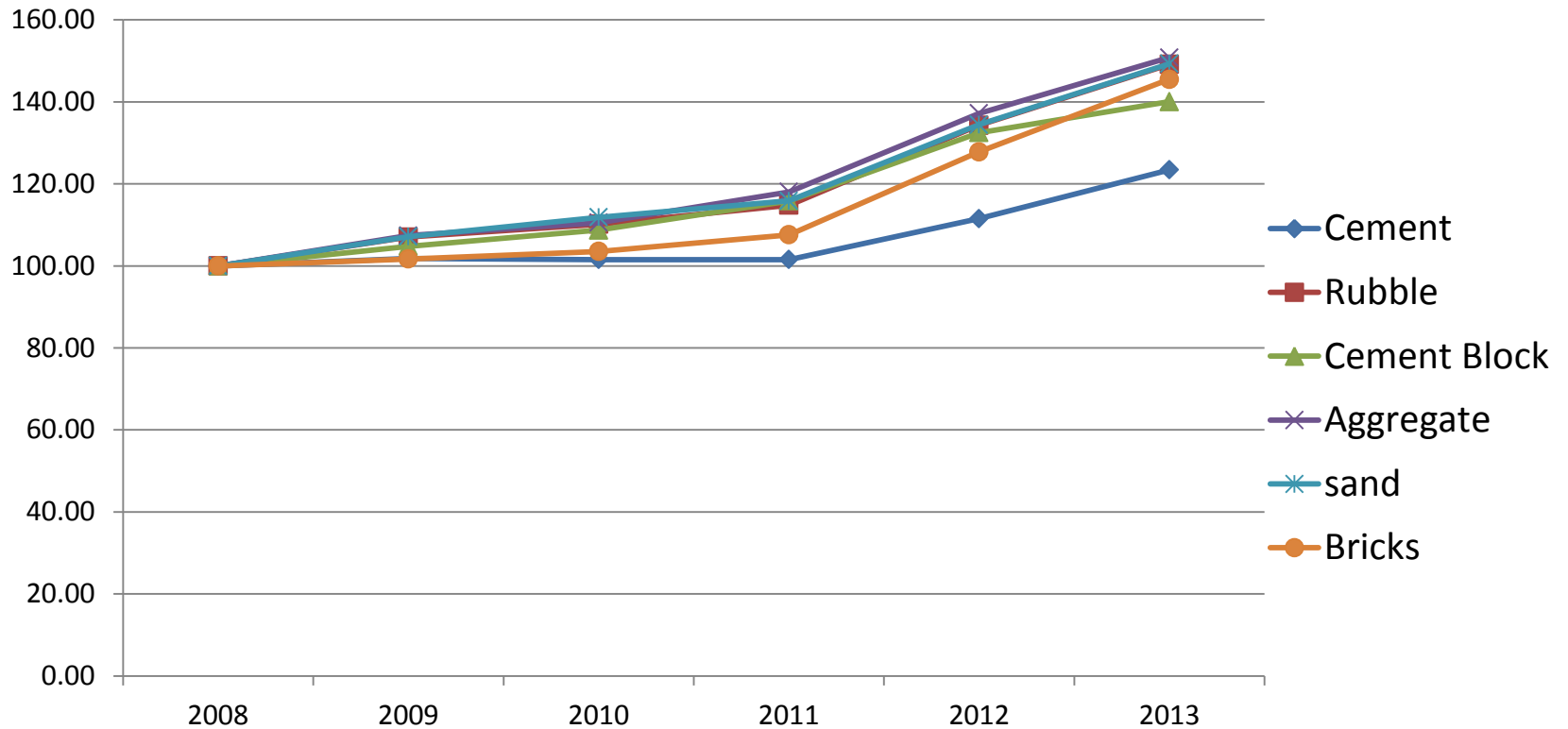
Construction Industry depends on mainly materials, equipment, labour, finance and time constraints.

Construction Material Imports

Category	Value in Rs Million				
Year	2009	2010	2011	2012	2013
Building Materials	75,290	92,905	118,935	157,437	175,054

- The ability to fulfill the construction material demand in the industry is not supplied by the local industry. Only a certain percentage of total construction materials is produced in Sri Lanka and the cost of construction material imports during the last 5 years.
- Foreign importers have a significant role in our construction projects and housing units.

Fluctuation of Prices of Construction Inputs Reflected by Indices



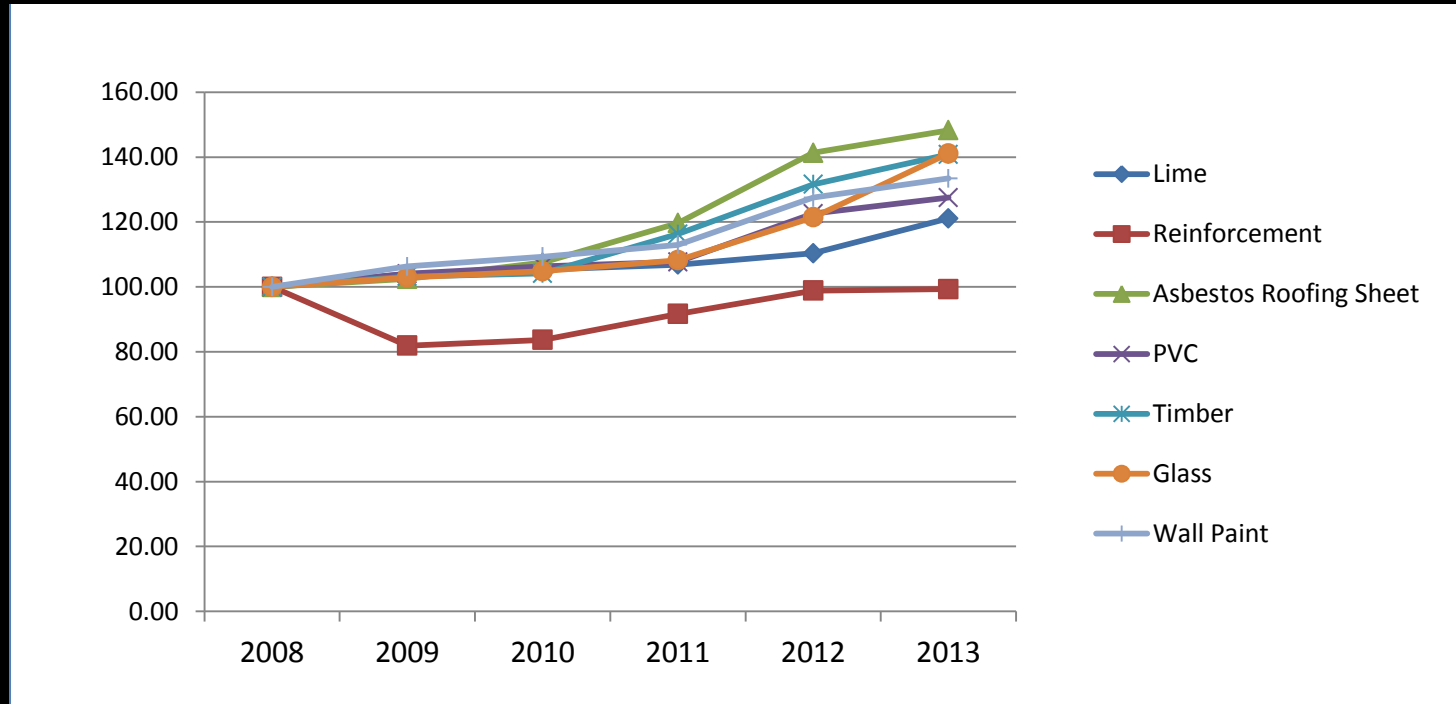
Material	2008	2009	2010	2011	2012	2013
Cement	100.00	101.82	101.55	101.55	111.51	123.42
Rubble	100.00	107.02	110.16	114.81	134.28	149.12
Cement Block	100.00	104.76	108.73	115.83	132.48	140.03
Aggregate	100.00	107.38	110.52	118.04	137.19	150.79
Sand	100.00	107.14	111.86	115.87	134.42	149.29
Bricks	100.00	101.67	103.54	107.58	127.78	145.47

Construction material prices and indices

Material price indices compiled by the ICTAD reflect that the material prices have increased at a moderate pace from the year 2008 to 2011. But with the launching of massive development drive by the Government in the post war environment, the material prices have gone up dramatically due to the robust increased in demand.

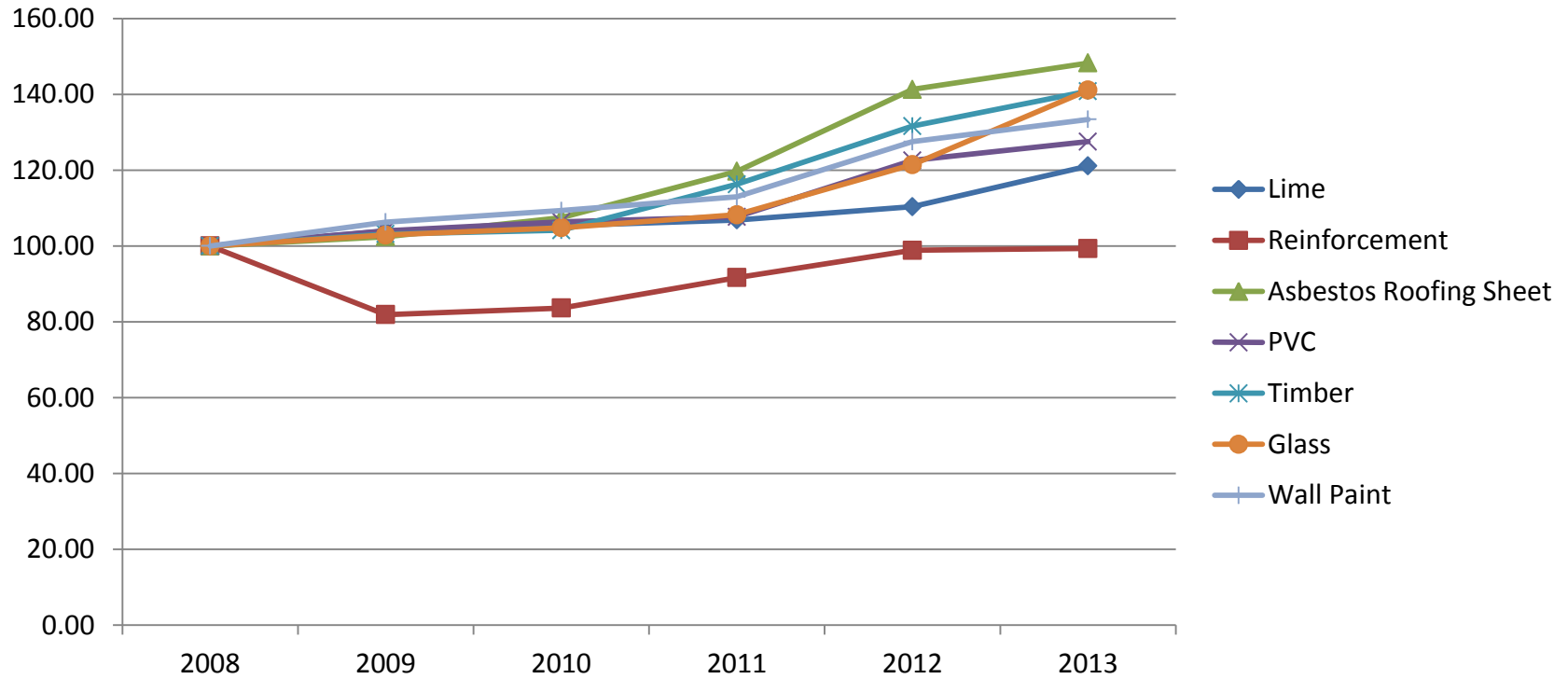
Material	2008	2009	2010	2011	2012	2013
Lime	100.00	103.94	105.36	106.85	110.35	121.10
Reinforcement	100.00	81.90	83.66	91.68	98.89	99.33
Asbestos Roofing Sheet	100.00	102.46	107.47	119.68	141.31	148.25
PVC	100.00	104.05	106.36	107.70	122.57	127.52
Timber	100.00	103.18	104.13	116.26	131.61	140.84
Glass	100.00	102.90	104.81	108.23	121.45	141.09
Wall Paint	100.00	106.31	109.32	112.96	127.53	133.40

Fluctuation of Prices of Construction Inputs Reflected by Indices



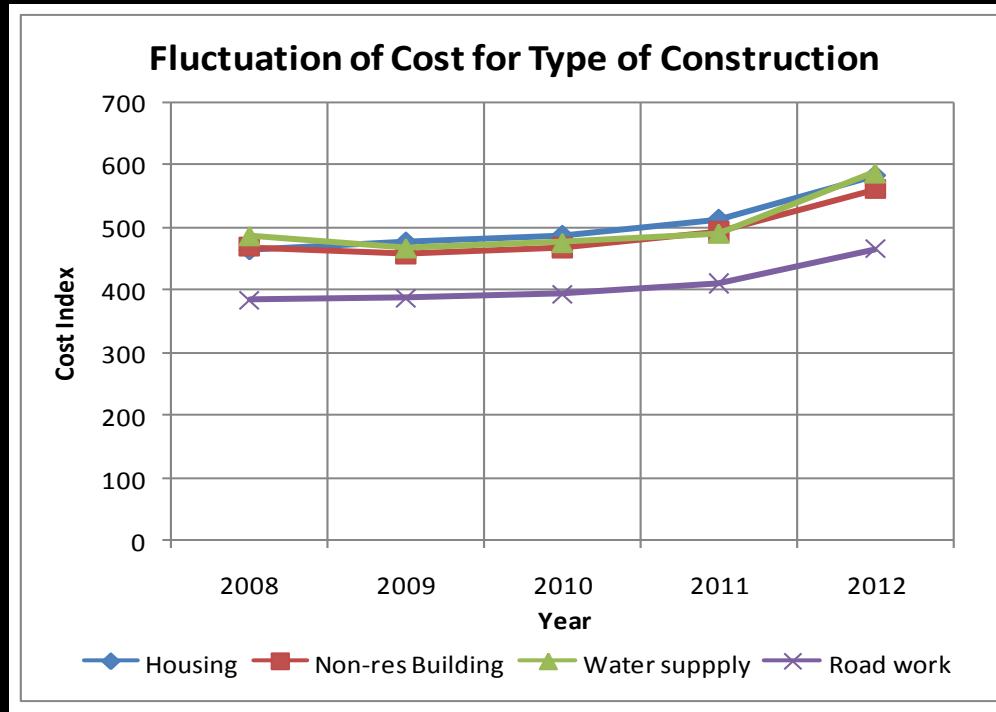
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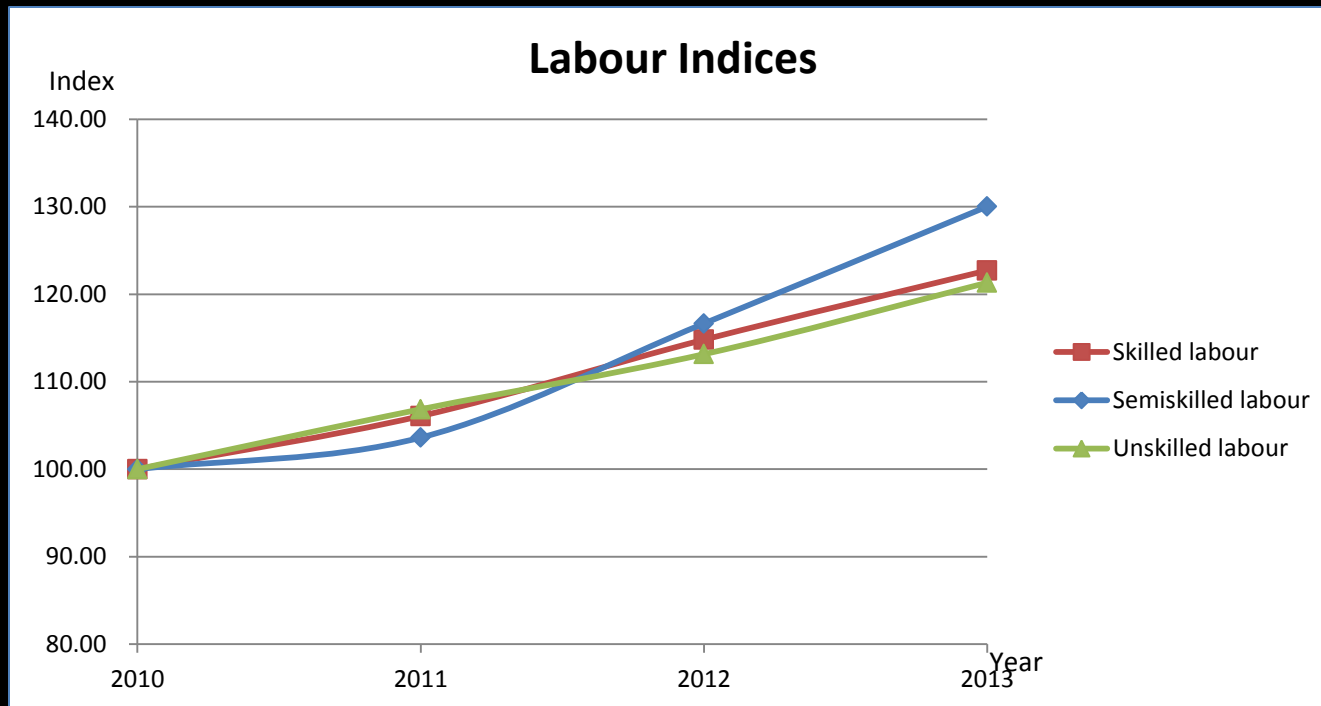
Continuous increase of labour wages due to scarcity of skilled craftsmen



Labour wages

Daily wages of the construction sector employees increased by an average rate of 10.2% during the year 2013. Daily wages for carpenters and masons in the construction sector increased by 8.0% and 8.1% respectively, compared to an increase of 12.4% and 11.9% respectively in 2012.

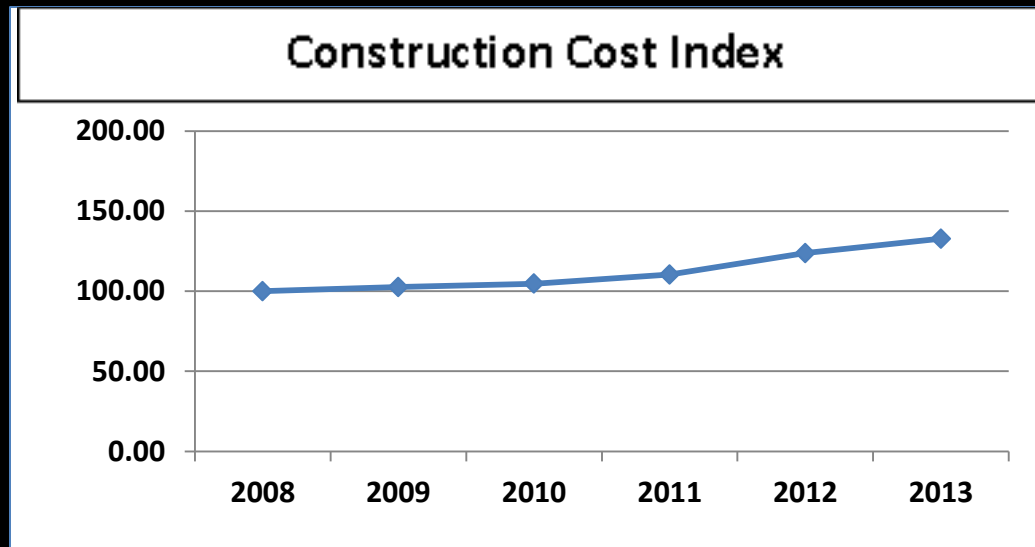
Labour wages are increasing at a rapid pace making the project cost escalated



Labour category	Indices		
	Skilled labour	Semiskilled labour	Unskilled labour
2010	100.00	100.00	100.00
2011	106.08	103.61	106.85
2012	114.80	116.65	113.14
2013	122.71	130.02	121.31

Construction cost

The cost of construction is going up continuously. This is evident in the construction cost index compiled by the ICTAD. The unit cost has been escalating due to price increase in major construction materials, labour, machinery and fuel.



	2008	2009	2010	2011	2012	2013
Construction Cost Index	100.00	102.59	104.76	110.38	123.86	132.75

Due to the escalation of material and labour prices resulting the increase of construction cost, has made the recently built condominium less affordable to the lower middle income categories .

Construction Investment Plan

Sectors	2007 – 2009	2010 – 2012	2013 – 2016	2007 – 2016
Housing	12,606	22,116	39,494	74,216
Infrastructure				
- Roads and Bridges	25,754	38,000	40,000	103,754
- Power	9,300	25,000	40,000	74,300
- Water Supply and Sanitation	25,211	10,000	8,000	43,211
- Others (Ports and Railway)	7,450	11,500	20,000	38,950
Total	80,321	106,616	147,494	334,431

Most of the Asian countries have many similarities in their respective cultures sharing the same values making them more closer and intimate.

In the arena of Construction, the more similarities exist due to the close resemblance of the geography, climate and physical socio and cultural context .

Therefore, Asia Construct provides the platform for close integration of professionals in the same region giving them an opportunity, to learn from each other sharing success stories and best practices.

The Asia Construct also provides opportunities to build a strong net work with the fellow professionals and institutions in the Asian Region ensuring the continuous and enhanced dialogue leading to the sharing of innovative technologies and sustainable construction practices, enhancing quality and productivity of the construction industry in their respective countries, creating a better quality of life for their people.

I must finally express my gratitude to the Hong Kong Polytechnic University for inviting us to take part in this prestigious gathering of industry professionals in the Asian Region.

I wish Asia Construct 2014 every success

Thank you.