

THE CONSTRUCTION SECTOR OF INDONESIA *

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1. EXECUTIVE SUMMARY

The economic growth of Indonesia is slow since the first quarter of 2013 due to the dynamic influenced of global economic. Economic growth of Indonesia in 2013 was 5.8% slower than 2012 which was 6.3% (Central Bank of Indonesia Report, 2013). The central bank estimates that the economic growth of 2014 is 5.1% – 5.5% and in 2015 the estimated economic growth will be 5.4% - 5.8% (Central Bank of Indonesia, 2013). CBC (2014) reports that GDP (2013) is 2,770.3 IDR trillion (based on constant price 2000). The construction growth of 2013 is 6.6 % lower than 2012 which was 7.4% and it is higher than the economic growth, and in the first quarter of 2014 the construction growth is 6.5% (CBS, 2014). Based on GDP (constant price 2000), economic growth from the first quarter 2014 to second quarter 2014 was 2.47% (q-to-q). Highest growth from second quarter 2013 to second quarter 2014 was achieved by transportation and communication sector which growth 9.53%. In 2014, there are 166 investment projects under groundbreaking which have investment value 628,91 IDR Trillion in which for infrastructure projects is 232.8 IDR Trillion. In the next five years (2015 – 2019), the new government estimates to push infrastructure investments of 4,886 IDR trillion by which 3,386 IDR trillion for strategic infrastructures and 1,500 IDR trillion for basic infrastructures.

2. MACRO ECONOMY REVIEW & OUTLOOK

2.1 Overview of National Economy

The economic growth of Indonesia is slow since the first quarter of 2013 due to the dynamic influenced of global economic. Economic growth of Indonesia in 2013 was 5.8% slower than 2012 which was 6.3% (Central Bank of Indonesia Report, 2013). The central bank estimates that the economic growth of 2014 is 5.1% – 5.5% and in 2015 the estimated economic growth will be 5.4% - 5.8% (Central Bank of Indonesia, 2013). CBC (2014) reports that GDP (2013) is 2,770.3 IDR trillion (based on constant price 2000). Economic growth in fourth quarter of 2013 compared to the fourth quarter of 2012 (y-on-y) was increased 5.72% (CBS, 2014). The growth occurred in all sectors of economy. In the second quarter 2014, economic growth was 5.12%. Based on GDP (constant price 2000), economic growth from the first quarter 2014 to second quarter 2014 was 2.47% (q-to-q). Highest growth from second quarter 2013 to second quarter 2014 was achieved by transportation and communication sector which growth 9.53% (CBS, 2014)

In 2013, the transportation and communication sector had a highest growth of 10.32%, followed by financial, real estate and company services sectors (6.79%). The construction sector growth achieved 6.68%, followed by energy, gas and water supply (6.62%), manufacturing industry (5.29%), services sector (5.27%), trade, hotel and restaurant (4.78%), mining sector (3.91%) and agriculture sector (3.83%).

*This paper is mostly based on construction statistic reported by CBS (2013) and CBS (2014)

2.2 Main Economic Indicators

The Indonesian economy has been growing significantly since last 5 years. The gross domestic product in 2014 under constant price 2000 is forecasted about 3,017,268 IDR Million which represents a 0.45% slightly increasing when compared to the previous year (2013). From the second quarter 2013 up to the second quarter 2014, the gross domestic product grew 5.12% as reported by the Central Bureau of Statistics data (CBS, Economic Indicators, August 2014). In the last five years, GDB at current price has been increasing steadily from 6,446,851.9 IDR million in 2010 to 10,523,270.3 IDR million in 2014 (fc). However, in term of GDP growth, Table 2 shows that it decreases from 6.50% (2011) to 6.40% (2012) and then 5.80% (2013). It is expected that it will increase 6.30% in 2014. However, inflation rate in 2013 is much highest in last 5 years. In 2013, the inflation rate was 8.4% and it is double than 2012 which was only 4.3%. The foreign exchange (IDR/USD) also increased and it is expected that in 2014 will be decreasing. It is claimed that political changing is blame to be the cause of such issues. In 2013 and 2014, there were two national general election both for members of parliaments and the president. During the last five year, labour force growth rate increased from 1.9% (2010) to 4.3 % (2014). In 2010, the number of population reached 237,556,000 and increased dramatically in 2013 is 248,422,000. It is forecasted that in 2014 the number of population will reach 252,069,000. Indonesia also has what many people say "demography bonus". The labour force in 2010 was 116,000,000 and then increased to 125,310,000 in 2014. Furthermore, Table 1 and Table 2 show the main economic indicators reflecting the progress of Indonesia development within the last five years.

The construction growth shows higher than economic growth. Eventhough in 2013, it was lower than previous years, the construction growth is still higher as compared to the economic growth. In 2014, the construction growth is forecasted to achieve 6.58% - 7.7% slightly lower (0.02%) or even higher 1.2 % than the construction growth of 2013. The growth is expected to increase since the new government will launch the five years development plan (2015 – 2019) in which infrastructure development becoming a key strategic role of the national economic development (Bappenas, 2014). Under this new government development plan, there are many strategic infrastructure development programme will be implemented. In the next five years (2015 – 2019), the government estimates to push infrastructure investments of 4,886 IDR trillion by which 3,386 IDR trillion for strategic infrastructures and 1,500 IDR trillion for basic infrastructures (Bappenas, 2014).

Table 1. Main Economic Indicators

Indicators	2010	2011	2012	2013	2014 (fc)
Economic Growth (%)	6	6.5	6.3	5.8	6.25
Construction Growth (%)	7.3	7.4	7.4	6.6	6.58
Inflation (%)	6.96	3.8	4.3	8.4	4,5% (±1%)
Foreign Exchange (Rp/US\$)	8.946	9.010	9.622	12.128	12.097

Source: Central Bank of Indonesia, Finance Ministry of RI, www.oilprice.net (2009) Updated (2012)

Table 2. Macro Economic Development Indicators

(1,000,000 IDR)

INDICATORS	2010	2011	2012	2013	2014 (fc)
GDP at constan prices 2000 Rp. Billion	2,314,458.8	2,464,566.1	2,618,938.4	2,770,345.1	3,017,268.7
GDP at current market price	6,446,851.9	7,419,187.1	8,229,439.4	9,083,972.2	10,523,270.3
GDP growth (%)	5.6	6.50	6.4	5.8	6.3
GDP growth (%) for agriculture, forestry and fishery sector	2.9	3.4	3.9	3.5	3.4
GDP growth (%) for manufacturing sector	3.6	5.0	6.3	5.6	5.7
GDP growth (%) for services sector	4.6	7.0	7.7	5.5	4.2
GDP growth (%) for mining sector	3.9	1.6	1.6	1.3	1,1
GDP growth (%) for construction sector	7.3	5.3	5.6	6.5	7.7
GDP growth (%) Financial, Ownership and Business Services	5,5	7.3	8.0	7.6	7.6
GDP growth (%)Transportation and Communication	11.9	13.8	15.1	10.2	7.4
GDP growth (%)Trade, Hotel and Restaurant	9.3	7.9	9.2	5.9	4.3
GDP growth (%)Electricity, Gas and Water Supply	7.2	4.2	4.2	5.6	7.5
Population (number)	237,556	241,417	244,775	248,422	252,069
Population growth rate (%)	2.9	1.62	1.39	1.49	1.49
Labour force (number)	116,000	109,67	112,80	120,17	125,31
Labour force growth rate (%)	1,9	(5,4)	2,8	6,5	4,3
Unemployment rate	8,595,600	7,700,220	7,610,000	7,410,931	7,147,069
Unemployment growth rate (%)	(7.16)	(10.42)	(1.17)	(2.62)	(3.56)
Inflation rate	6.96	3.8	4.3	8.4	4,5% (±1%)
Short term interest rate (%)	17.56	17.58	18.00	18,4*	18,9*
Long term interest rate (%)	15.18	15.27	16.00	16,8*	17,7*
Changes in Consumer Price Index (2007=100)	118.37	114.59	131.92	149,8*	170,0*
Average change against USD\$	8.946	9.023	9.622	12.128	12.097

Source: CBS (2009, 2010, 2011, 2012, 2013); Central Bank of Indonesia (2009, 2010, 2011, 2012, 2013); statistics Indonesia

3. OVERVIEW OF THE CONSTRUCTION INDUSTRY

3.1 Construction Investment

The construction value completed can be seen in Tabel 3. In the last five years, civil works were dominant construction projects in Indonesia. Civil works usually are financed by both central and local government as well as the state owned companies whose infrastructure business. In the next five years (2015 – 2019), the new government estimates to push infrastructure investments of 4,886 IDR trillion by which 3,386 IDR trillion for strategic infrastructures and 1,500 IDR trillion for basic infrastructures. The strategic infrastructure development plan to response archipelago connectivity include Sunda Brigde, Hub International Port (Kuala Tanjung, Maloy, Bitung), Trans Sumatra Highway, Trans Jawa Highway, National Road for Trans Kalimantan, National Road for Trans Sulawesi, National Road for Trans Maluku, Nasional Road for Trans Papua, Trans Sumatra Railway, Trans Kalimantan Railway, Trans Sulawesi Railway, Development of International dan Domestic Airports, National Capital Integrated Coastal Development (NCICD), Java Coastal Protection, Palapa Ring, Satelit Broadband, Consolidated Data Center.

Another strategic infrastructure development to be built for improving water resource management is river rehabilitation and dam restoration across the nation. Urban infrastructures are also targeted to improve urban area development such as MRT East-West, North-South Phase II and Monorail Jakarta, Elevated Loop Line Jabodetabek and BRT in 16 Cities, airport railways in Jakarta and other metropolitan cities, sewerage systems in Jakarta & other metropolitan areas. In addition, energy infrastructures are also the main concern of the government. The infrastructure energy investment covers development of coal powerplant Pembangunan near mining area of 5.000 MW including its cable distribution system under the sea of Jawa-Sumatera, Jawa-Kalimantan and Kalimantan-Sulawesi, development of geothermal power plant, development of LNG receiving terminal, oil refinery and gas networks across cities.

Funding of those construction investments are challenging since the government only provide small portion of investment required (30%) while the state owned company is aslo only 30%. Therefore, the government proposes PPP moderately for infrastructure investment about 20%. The rest is solely relied on off balance sheet (20%). The creative financing scheme is expected to overcome such off balance sheet.

Table 3. Type of Construction Completed (2010 – 2013).

Type of Construction	2010	2011	2012	2013*
Building Works	95 397 270	108 768 763	128 551 604	148 334 444
Civil Works	169 975 358	202 325 448	237 019 258	271 713 059
Special Construction Works	54 876 925	65 029 137	74 782 311	84 535 490
TOTAL	320 249 553	376 123 348	440 353 173	504 582 993

Notes: Benchmark Series Data

* Preliminary Figures

Source: CBS (2014)

3.2 Construction Companies

According to Law No. 18/1999, construction company consists of consulting and contracting company. Consulting company can be as planner and designer and also supervision engineer. Most of construction companies are small medium enterprises. Under the new registration scheme and classification, Table 7 shows updated number of construction companies in 2014.

Table 7. The Number of Construction Companies including Consulting Companies

NO	QUALIFICATION	CONTRACTING COMPANIES		CONSULTING COMPANIES	
		NUMBER	%	NUMBER	%
1	LARGE	3.939	3	429	7
2	MEDIUM	11.322	8	908	14
3	SMALL	126.698	89	5.081	79
	TOTAL	141.959	100	6.418	100

Source: NCSDB (2014)

The number of foreign construction companies has been increasing after MP3EI launched in 2011. In 2013, the number of foreign contracting companies registered in Indonesia is 302 firms mostly coming from Japan dan China as well as Korea. The number of contractors from China working in Indonesia now increases 53 firms. The number of Indian contractors remains 4 since 1 contractor left.

Table 8. The Number of Foreign Construction Companies

Year	2009	2010	2011	2012	2013
ASEAN	14	14	16	16	16
NON-ASEAN	184	193	237	239	286
Total	198	207	253	255	302

Source: PusbinUK (2012)

Table 9. The Origin of Construction Companies in Indonesia

Tahun	2009	2010	2011	2012	2013
Japan	75	74	80	80	81
China	32	32	39	39	53
Korea	26	33	57	60	81
India	0	1	5	5	4

Source: PusbinUK (2013)

3.3 Construction Employees and Workforce

The number of workforce working in the construction sector is more than 5 million people in average. The following table 7 shows annual number of construction workers. The number of skilled workers registered by NCSDB (2014) is 43,381 persons consisting of 3rd class of skilled workers (4,563), 2nd class of skilled workers (9,765) and 1st class of

skilled workers (30,921) respectively. The number of professionals working in the construction sector is 59,378 persons consisting of junior engineers (31,867), senior engineers (26,687) and principal engineers (2,975) respectively.

Table 11. The number of construction workforce

Year	2010	2011	2012	2013	2014 (feb)
Construction Labour	5,590,000	6,340,000	6,869,565	6,349,387	7,211,967

Source: CBS (2014)

REFERENCES

1. Central Berau of Statistic (2014), Economic Indicators, Jakarta
2. Central Berau of Statistic (2013), Economic Indicators, Jakarta
3. Central Bank of Indonesia (2009), Annual Report of National Economy, Jakarta
4. Central Bank of Indonesia (2010), Annual Report of National Economy, Jakarta
5. Central Berau of Statistic (2007), Economic Indicators 2007, Jakarta, Indonesia, June, 2007
6. Mulyo, SS & Abidin, IS (2007), Construction Market in Indonesia, Japan - Indonesia Seminar II, Department of Public Works, Republic of Indonesia, Jakarta.
7. Public Works Department (2008), Program and Target Development, Jakarta
8. Suraji, A (2007), The Indonesian Construction 2030, National Construction Services Development Board, Jakarta
9. Wuryanti, W (2005) Cost Index Component of Reinforce Concrete & Composite for Building Construction (in Indonesian), Seminar, Institute for Research & Development, Ministry of Public Work, Jakarta.

HARMONIZING THE INDONESIAN CONSTRUCTION RESOURCES SUPPLY CHAIN

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ABSTRACT: As far as construction production factors, Indonesia is blessed with several abundant natural resources. On the other side, due to the geographical characteristic of the Indonesian archipelago, just distribution of resources needed for supporting construction as well as infrastructure development is a big challenge. In particular, when it comes to engineered resources, such as manufactured materials, equipment, and technology, as well as other resources such as labor forces, finance and land, Indonesia still faces many problems to be solved. The Indonesian government takes a leadership role to harmonize the construction supply chain to guarantee the availability of construction resources for construction industry; in terms of quantity, quality, location, and time.

KEYWORDS: equipment, finance, harmonization, labor, land, materials, technology, supply chain.

1. INTRODUCTION

Indonesia, as a developing country, with more than 240 million people living in the areas, needs infrastructure development to support and maintain its economic growth of about 6% per year. In its medium-term master plan (RPJM) and the economic acceleration master plan (MP3EI), there is a high priority to build sustainable infrastructures to increase the connectivity of the Six Indonesian Economic Corridors; Sumatera, Java, Borneo, Celebes, Bali-Nusa Tenggara, and Moluccas-Papua. In order to realize the investment of 4,012 Trillion Rupiah in total until year 2025, about 1,786 Trillion Rupiah (1 USD is equivalent to approximately Rp 12,000 at the time of preparation of this paper) investment for infrastructure according to the master plans, a national logistic system development master plan was established by the Indonesian government in 2012. In this regard, the connectivity within and to Indonesia, a vast archipelagic country consisting of more than 13,000 islands, is the crucial issue.

The logistic system master plan has a vision: “locally integrated, globally connected for national competitiveness and social welfare” and the objectives: to reduce logistic cost and to increase logistic services for elevating national product competitiveness; to guarantee the availability of primary commodities all over the Indonesian region with affordable prices; and to prepare the national logistic to face the integration of ASEAN logistic services in 2015. Since the the national logistic system master plan relies heavily on the development of

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transportation infrastructure as well as other infrastructure, the construction industry holds an important and strategic role in its realization, through the provision of sustainable infrastructure.

As many other nations, the Indonesian construction industry contributes to the wealth of the nation; construction sector contributes about 6.5% of the GDP and around 6% of national labors depend on this sector (Statistics Indonesia, 2013). Moreover, construction industry creates physical assets or infrastructures to support the social-economy activities of the nation. In this case, the construction industry will contribute to the investment of infrastructure to support the development of the much required logistic system for the nation economic. On the other hand, the existence of appropriate logistic system will support the construction industry by providing the needed resources all over the Indonesian regions, which in turn will improve the quality of construction products and the construction industry growth as well.

Recently the Indonesian construction industry experienced a quite significant growth although mostly contributed by construction activities in major cities of the western part of Indonesia, while the rest of Indonesian regions contributed insignificantly due to limited access infrastructure. The biggest challenge for the industry in contributing to the economic acceleration program is to build infrastructure within the limited availability of supply chain of resources. To respond to the challenge, the Indonesian construction industry puts an effort to harmonize its supply chain of resources in supporting the construction of infrastructure investments.

2. INDONESIAN CONSTRUCTION RESOURCES

On the following sections, several construction resources in Indonesia: construction companies, labor forces, materials, equipment, finance, technology and know-how, and land will be discussed. Some critical problems and consideration of potential solutions will be identified.

2.1. Construction Companies

As of May 2013, there were 117,042 registered contractors in Indonesia; 941 or 0.8% of them are big size contractors; 11,002 or 9.4% are medium size; and 105,099 or 89.8% are small size contractors (Husaini, 2013). The distribution of construction works are not even among the contractors. In year 2012, total value of construction was Rp. 324 Trillion and about 85% of them were performed by big size contractors. The concentration ratio for 8 biggest contractors (CR8) is 0.2 which means that the market is considered competitive for big contractors. In addition, most of the contractors are categorized as generalists than specialists. The above information shows that fragmentation occurs in Indonesian construction industry, which brings concern for the construction practitioners in Indonesia, since the performance of construction industry would have potential impacts to the economics of the nation.

Abduh and Rahardjo (2013) mentioned three problems faced by construction companies in Indonesia related to the existing supply chain:

1. There is no competition among the existing contractors' supply chain, among the reasons are : the lack of real competitions among contractors; no demand on managing

supply chain from the owners; ad-hoc and temporary relationships among parties in the existing supply chain; and, no loyalist in the existing supply chain.

2. Members of supply chain performing the execution of the project are in many cases not the same as the members that were proposed in the bids, among the reasons are: the lack of SCM practices in contractors; limitation to have eligible sub-contractors in a project; no unbiased protection to the sub-contractors; and, no incentives to have long-term relationship between project participants.
3. There is no natural localization of contractors in Indonesia, among the the reasons are: excessive intervention from the big national contractors to local district projects; no capacity buildings for local district contractors; and, vertical integration practices by some state-owned enterprises.

The Indonesian government, represented by the Ministry of Public Works, has been very keen to solve the problems. There have been three national seminars conducted and the establishment of four working groups by the Minister of Public Works to work on those issues since 2011. The strategy chosen by the government was to implement Supply Chain Management (SCM) practices in construction companies and projects, as well as in the industry level. Several policies for executing the strategy have been developed including the following:

1. Advising the construction projects' owners to proportionally consider the existing supply chain related to their projects in preparing their work packages with the main objective to achieve the values demanded by the owners.
2. Promoting the elimination of regulation that currently limits the numbers of eligible sub-contractors in a construction project.
3. Promoting the implementation of Supply Chain Management (SCM) practices in construction firms, especially for big-size and the state owned contractors.
4. Forcing the big size contractors to implement partnering with local contractors in delivering their construction projects, to empower the local contractors, and to include the local contractors in their SCM systems.
5. Promoting the medium and small size contractors to become specialists rather than generalist contractors and practicing under big size contractors' SCM. For this, the classifications of contractors, as well as their definitions, are important to be settled first. Providing productive and conducive subcontracting environment and mechanisms to protect the subcontractors properly in their businesses, which in turn will provide decent works for the smaller scale contractors while developing their specialist trade skills to become qualified specialist contractors.

2.2. Labor Forces

In 2012, there were 6.8 million construction workers employed in the sector, which accounted for 6.13% of the national labor forces (110.8 millions). With the average annual growth of construction sector employment of 5 %, the projected number of construction workers in 2014 is around 7.4 million. About 60% of them are semi and non-skilled workers, 30% are skilled workers, and 10% are professionals. Most of the workers, about 88%, were graduates from only primary and secondary level education, the rest were graduates from vocational high school (8%), vocational colleges (1%) and universities (3%). . Only 10% of the construction workers are certified for their competences, hence supply of qualified and certified construction labors in Indonesia is a serious issue.

The high growth of the construction industry has created more demand for construction labors than what are currently available as supply. This condition occurs for both government and private construction projects. According to the Indonesian construction law, only certified professionals and skilled workers are allowed to work in construction. However, due to the limited availability of certified personnel, there are practices of renting engineers' and skilled labors' certificates from other regions (particularly Java regions) just for administration purposes carried out by bidders to be qualified for the works, but when the contract is awarded the actual works are conducted by local engineers without any certifications.

The Indonesian government demands adequate construction worker's competencies to ensure the quality of construction products through the requirement of professional expert and skilled labor certifications. In this case, the government tried to enhance the construction labor quality through standardized working competencies, competency-based trainings, and certification programs. The government accelerated the efforts through the Accelerated Construction Training Program (ACTP) 2010-2014 to produce 3 million certified construction workers by the end of 2014. The ACTP's training programs were conducted by several agencies, such as the Ministry of Public Works, the Ministry of National Education, the Indonesian Construction Services Development Board (LPJK), the Ministry of Manpower, and other government agencies. The professional associations are expected to help developing their members' professional competencies by encouraging, providing subsidy, delivering training for their members. Unfortunately, until the paper was written, the progress of ACTP is unsatisfactory (Hasiholan et. al., 2014).

2.3. Construction Materials

The Indonesian government has been conducting research in identifying the structures of material supply chain in construction. It was identified that Portland cement, steel, and asphalt are categorized as strategic materials for construction in Indonesia considering their supply chain' structures. Some general challenges were identified as related to the need of : more robust estimated demands of construction material in terms of quantity, specification, location, and time needed; more supplies to support the concentration of demands during certain time; improvement of infrastructure to support limited accesses for material distribution to wider and remote regions; development of material catalog for consumers.

2.3.1. Cement

The consumption of cement in Indonesia increases from time to time as Indonesia is developing its economy. However, the Indonesian cement consumption per capita is still low compared to Vietnam, Thailand and Malaysia. It was recorded in 2008 that the national consumption per capita of the cement was 151 kg and supplied by national cement production. However, the gypsum, as raw material for cement production, is still imported. The production of cement in Indonesia is depicted in Table 1:

Table 1: Cement Production Capacity and Consumption (Natsir and Supriyatna, 2012)

	2004-2005	2006-2010	2011	2012
Production Capacity (million ton/year)	47	37.5	56.8	61
Consumption (million ton/year)	32	39.9	43.4	51.8
Utility (%)	68.15	106.3	81.2	85

Even though the utility of the national cement producers is below 100% (around 85%), the supply chain cannot support the demands of cement all over the country. It was found that in remote locations such as in the eastern regions of Indonesia, the cement prices are unbelievably high due to limited access, especially for Ordinary Portland Cement (OPC). There is also an issue related to the current trend in Indonesia that OPC is being replaced by Portland Pozzoland Cement (PPC) and Portland Composite Cement (PCC) in order to take advantage of their properties which are more suitable to various environment condition. This trend, if not managed accordingly, could cause instability of cement supplies and also compromise the quality of construction products (Natsir and Supriyatna, 2012).

2.3.2. Steel

Raw materials for steel production are iron ores, pellet, and scrap. Iron ore mines are located in several islands in Indonesia. Iron ore deposit in Indonesia is estimated at one billion ton. However, most of them are exported since the technology for smelting them are not available in Indonesia. Pellets are imported 100% in the amount of 2 million ton per year, while scrap materials are imported 80%.

The steel consumption per capita of Indonesia is still considered low, compared to other ASEAN countries, such as Vietnam, Thailand and Malaysia. In 2008, the consumption is 39 kg per capita. In 2012, the national capacity of steel materials in Indonesia was 18.9 million tons, while the national consumption was 13.3 million tons, or 78% utility. However, each year Indonesia imports 7.2 million tons of steel, therefore the utility for local steel producer could be 113%. It can be concluded that the Indonesian steel production is heavily depending on importation. This condition affects adversely the Indonesian construction industry every year when the exchange rate is volatile and especially when the demand per month is at the peak, i.e., during the fourth quarter. In the case of high tensile strength steel, Indonesia has not developed its capacity, even though the demands for high tensile strength steel are growing as the development of large infrastructure in Indonesia is underway to support the acceleration of the Indonesian economic growth.

Some efforts have been implemented to improve the support of steel industry to the construction in Indonesia, such as development of steel demands data base, prohibiting importation of minerals (iron ores), development of steel catalog, and cooperation between construction steel supply chain members (Natsir and Supriyatna, 2012).

2.3.3. Asphalt

Raw materials for making asphalt or bitumen for construction are crude oil and natural bitumen. Asphalt made from the residue of crude oil refinement is the most widely used in Indonesia. However, with the advancement of oil refinement technology, the quantity and quality of its residue decreased and would influence the supply of asphalt eventually. In the meantime, the Indonesian oil production is decreasing from time to time and nowadays Indonesia imports more crude oil to support the national demand. These situations is detrimental to the production of asphalt and its supply to construction industry in Indonesia the future. Recently, the Indonesian government tries to increase the usage of natural bitumen. The Indonesian natural bitumen deposit is located in the island of Buton, therefore it was named as Buton Asphalt or Asbuton.

The national capacity of asphalt production in 2012 was 0.89 million ton, while the consumption was 1.315 million ton hence the utility was 147%. This asphalt consumption was fulfilled by Pertamina (the national oil company) (73%), imported asphalt (22%), and Asbuton (only 4%), as shown in Figure 1.

The government effort to escalate the usage of Asbuton is a big challenge with a big question, since the same effort had been addressed in 2006 without any significant achievement. The Asbuton deposit is considered large, about 600 million ton of rock asphalt but it only contains asphalt as much as 5-30%. The available technology for fully extracting the asphalt in economic scale of production is yet to be developed. The usage of natural bitumen for pavement in Indonesia is still considered very limited (5%).

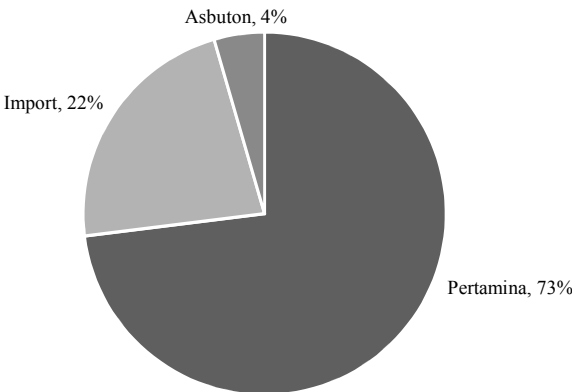


Figure 1: Asphalt Production Capacity (Natsir and Supriyatna, 2012)

2.4. Construction Equipment

Heavy equipment are very important for Indonesian construction industry, even though Indonesia still heavily considers to use as much as possible labor forces for construction. The heavy equipment are used for supporting the labor forces in doing their works, for works that could not be done by labor forces in terms of quantity, quality, and productivity, and for safety reasons. About 30% of heavy equipment are manufactured by local industry with local material content of as much as 50%, while the rest are still imported. However, for high quality or performance components and main engine, the local manufacturers are still importing them.

It has been identified in 2012, that the national production capacity of heavy equipment, especially for earthworks, was 150.000 units. Meanwhile, the consumption was 210.000 units, hence showing a utility of above 100%. Most of the heavy equipment are located in Jakarta province (76.000 units). The growth of heavy equipment sale was 30% in 2011. However, the construction industry only consumes about 13% to 20% of the sales. It means that construction industry is not a big market for heavy equipment industry. This condition will lead to lesser bargaining power of construction industry in heavy equipment national demands.

Beside new equipment, construction used a lot of re-conditioned equipment. There are 65 heavy equipment re-conditioning firms existing in Indonesia. But the number has been

decreasing since the regulation on importation does not allow the import of used equipment to Indonesia. Other construction equipment and special equipment, such tower crane, tunnel boring machine, launching gantry, etc., are not monitored specifically by construction equipment association or government, therefore there is no information regarding their demands and supplies (Natsir and Supriyatna, 2012).

2.5. Finance

One of the most important resources for construction is money. To support the construction industry, money related services would be in the forms of financing, bond, and insurance. Those services are performed by many banks and insurance companies that will support the construction firms, suppliers and sub-contractors in their operations. One notable service is provided by the Indonesian Eximbank (LPEI), an export credit agency. Its operation is not limited to construction firms that will operate a construction project in a foreign country, but also to construction firms that operates construction projects in Indonesia (Erata, 2012).

However, as there is increasing demand for infrastructure development in Indonesia, the Indonesian government provides a better framework to attract private investment and participation in a measurable scale in infrastructure projects and also provides alternative financing schemes for local government to build their infrastructures. To fulfill this demand, the Indonesia Infrastructure Guarantee Fund (IIGF or PT. PII in Indonesia) was established as a state-own company, as a single window for appraising, structuring, and providing guarantees for Public-Private Partnership (PPP) infrastructure projects.

Moreover, for supporting local governments in developing their infrastructure, the Indonesian government provides a government agency for investment, the Government Investment Center (GIC or PIP in Indonesian). This agency provides soft-long-term loan to any local government that need funding for developing their infrastructure. The local government will install the debt yearly after the grace period. The loan will be integrated into the local government's budget.

2.6. Technology and Know-how

In terms of technology and know-how resources for construction, there is not much to be explained in this paper, since there is no formal or official effort by the government in monitoring those resources. The construction technology and know-how are managed by individual construction firms. However, there are a few construction firms that have implemented technology or knowledge management in their companies and mostly are not accessible to public. No policy issued by the government related to technology and knowledge management yet. Documents related to technology used by construction industry as well as the technology created by the Indonesian scholars and companies are still needed.

2.7. Land

Land is a major issue in Indonesia that always defers the execution of the infrastructure projects and raise social concern of the projects. Based on the experience of 35-year building 792.9 km toll-roads in Indonesia, the Indonesian government realized that the major constraint of toll-road development is land acquisition. Despite the enactment of several regulations to streamline the land acquisition processes for building infrastructure, almost all

infrastructure projects were still deferred due to the issues of the effectiveness of the regulations, law enforcement, and corruption prevention related to the land acquisition processes. (Wirahadikusumah et. al., 2013).

In 2012, the Indonesian government has just issued a law regarding land acquisition for development of public facilities. Many practitioners in infrastructure and construction believed that this law could provide clearer processes that should be applied by many parties, and also more assurance on the result of the processes. After this law was issued, the President followed it with issuance of Presidential Decree regarding the Implementation of Land Acquisition Process for Development of Public Facilities as an operational regulation. However, the effectiveness of those regulations is still awaited. There is so far no study yet reporting the implementation of those regulations/

3. CONSTRUCTION SUPPLY CHAIN HARMONIZATION

Problems identified in construction resources supply chain as aforementioned had opened the awareness of the government as well as the construction practitioners on the need of holistic action in managing construction supply chain; not only in project level, but also in industry level of construction supply chain. In 2012, the Indonesian government - represented by the Center for Investment and Resources, Construction Development Agency, the Ministry of Public Works - has addressed the importance of construction supply chain management to support the Indonesian construction industry as reported in the Indonesian Construction Series year 2012, which had a theme of “Harmonization of Construction Supply Chain: Concepts, Innovations, and Application in Indonesia”. In this report, government agencies, scholars, academia, and practitioners put their effort together to bring solutions to construction supply chain problems.

The harmonization of construction supply chain has the following objectives (Goeritno, 2012):

- a. To guarantee the availability of construction resources for construction industry; in terms of quantity, quality, location, and time;
- b. To improve the efficiency of construction industry; and
- c. To encourage the autonomy of the national construction industry.



Figure 2: Theme of Harmonizing Construction Supply Chain in Konstruksi Indonesia 2012 Construction Year Book

However, the harmonization of construction supply chain is still a big challenge for the Indonesian construction industry, it is easier said than done. The government has already put attention to it by establishing a special steward body for the harmonization of construction resources, the Center for Investment and Resources (Pusbin SDI), in the Construction Development Agency of the Ministry of Public Works. However, more participations from other stakeholders of construction supply chain are still expected. Actually this was mandated in the Indonesian Law of Construction Services enacted in 1999 (UUJK). The Center for Investment and Resources itself has set up a roadmap for harmonizing the construction supply chain in Indonesia from 2010 until 2030 (Figure 3).



Figure 3: Roadmap for Harmonizing Indonesian Construction Supply Chain (Goeritno, 2012)

A coordination forum has been established with members coming from government agencies related to construction supply chain, associations of manufacturers, associations of contractors, associations of suppliers and academia. The forum encourages the members to share information related to demands and supplies of construction resources. Some raising issues related to strategic plan of harmonization as well as immediate actions to be taken are discussed and solved. However, not all of the issues could be solved right away, since those issues would relate to many parties to take actions or to make decision, and time is also needed to change regulations. Some members of the construction supply chain are governed by other sectors (and not under the national construction services law), i.e., manufacturing industry, mining industry, trades, and local government (Figure 4). The forum itself is facilitated by the Center for Investment and Resources.

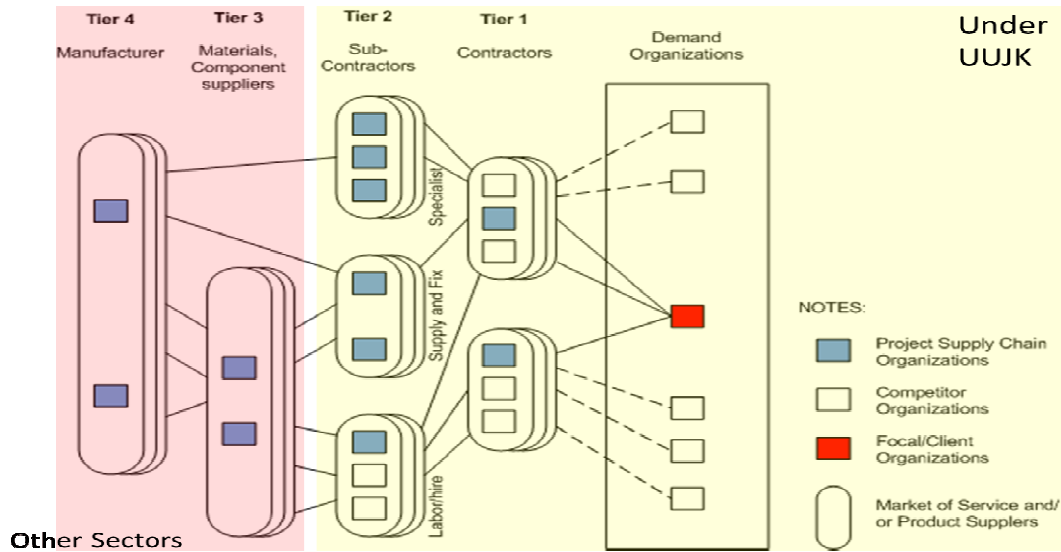


Figure 4: Governance of Construction Supply Chain in Indonesia (Abduh, 2012)

However, there are still some challenges for the forum to harmonize the construction supply chain, they are:

- a. Leadership role of the Center for Investment and Resources in the forum.
- b. Openness of each member in sharing information regarding supply and demand of particular resources.
- c. Willingness to work together with the same objective between members of the forum.
- d. Synchronization of regulation related to particular construction resources with a perspective of supply chain.
- e. Strong commitments from all of members of the forum in delivering the objectives of harmonization of construction supply chain.
- f. Continuous improvement for all the processes related to the effort of harmonizing the construction supply chain.
- g. Sharing information to the public as a part of accountability of the forum.

The harmonization of the supply change should take place in the framework of a larger harmonization effort within the national construction industry development scheme to build a strong, reliable and competitive industry. A proposed harmonization scheme involving the process of harmonizing laws and regulations, institutional structures and policies, and program implementations is shown in Fig.5. A study by the UK Department for Business Innovation and Skills (2013) shows that there are four driving factors in building the competitiveness of construction industry: the availability of competent human resources with sufficient quantity, access to competitive financing sources, innovation and development of a strong construction supply chain. The study shows the importance of building a strong supply chain in order to be competitive in the industry, at the local, regional and global scale. The harmonization process is expected to develop an enabling competitive market environment for the industry as well as a strong supply chain for the construction industry in terms of human resources, construction plants, materials, financing, technology and know-how, as well as availability of information sources, both on the market as well as on the supply side of the industry (Pribadi, 2014).

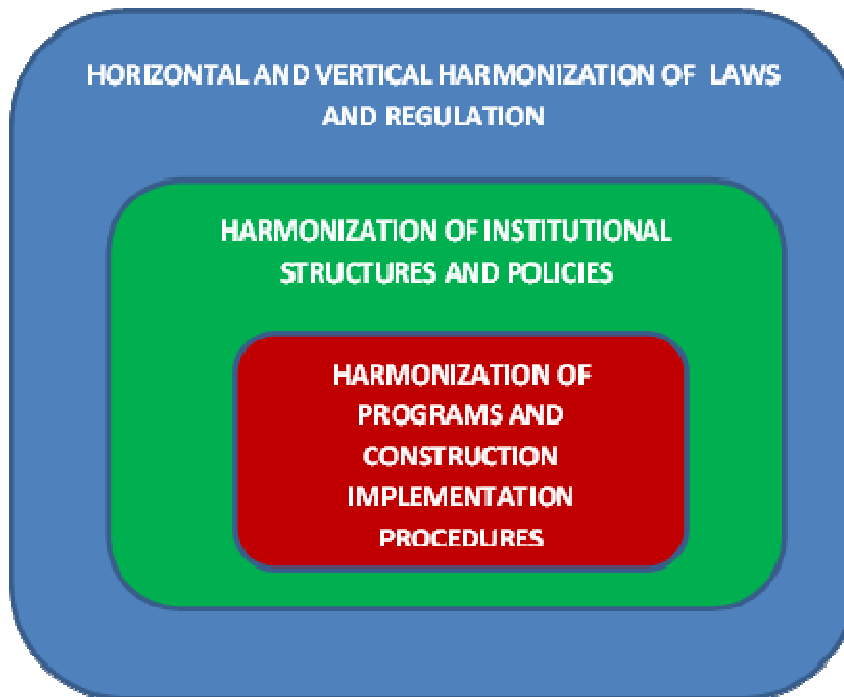


Fig.5. Framework for Harmonizing the National Construction Industry (reproduced from (Priyadi, 2014))

4. CONCLUSION

Indonesian government has been keen to implement supply chain management in construction for answering latent problems faced by the construction industry, especially in ensuring the availability of construction resources; in terms of quantity, quality, location, and time. It is believed that the performance of the construction industry is highly correlated with the performance of its supply chain. On the other hand, the performance of the supply chain is determined by the interaction between the structure of the supply chain and the conduct of its members. Therefore, in order to improve the performance of construction industry, the harmonization of construction supply chain is a must.

Problems and challenges in managing construction supply chain in Indonesia have been identified. The government tried to minimize them since they will cause poor performance of the Indonesian construction industry. An effort to harmonize the construction supply chain in Indonesia has been conducted since the last two years by the use of a coordination forum of construction supply chain.

5. ACKNOWLEDGEMENTS

The authors wish to express their gratitude to the Center for Investment and Resources (Pusbin SDI) for providing data used in this paper. Moreover, most of the information cited in this paper is already published in the Indonesian Construction Series Yearbook 2012. The author also appreciate the support of the Indonesian National Construction Services Development Board (LPJK) and the Indonesian Ministry of Public Works for their support on participating in the AsiaConstruct 2014 conference.

6. REFERENCES

- Abduh, M. (2012). Indonesian Construction Supply Chain (in Indonesian). Indonesian Construction Series year 2012. Ministry of Public Works.
- Erata, I.M.G. (2012). Role of the Indonesian Eximbank in Providing Finance and Guarantee for Construction Supply Chain (in Indonesian). Indonesian Construction Series year 2012. Ministry of Public Works.
- Goeritno, B. (2012). Harmonization of Construction Resources (in Indonesian). Indonesian Construction Series year 2012. Ministry of Public Works.
- Hasiholan, B., Abduh, M., and Soekirno, P. (2014). Towards 2015 ASEAN Economic Community: Indonesian Construction Engineer's Current State and Improving Policies. Proceedings of the ConCERN 2014, Institut Teknologi Bandung, 4-5 November 2014, Bandung, Indonesia.
- Husaini, H.W. (2013). Indonesia Construction Industry Overlook. Proceedings of International Seminar on Optimization of Heavy Equipment for Road Construction. Construction Development Agency, Ministry of Public Works. 1 October 2013. Jakarta. Indonesia.
- Natsir, M., and Supriyatna, Y. (2012). Efficiency Improvement of Construction Materials and Equipment Supply Chain (in Indonesian). Indonesian Construction Series Yearbook 2012. Ministry of Public Works.
- Abduh, M., and Rahardjo, A. (2013). Strengthening the Construction Supply Chain: Indonesian Approach in Construction Economics Programs. Proceedings of the 19th Asia Construct Conference. November 14-15, 2013. Jakarta, Indonesia.
- Statistics Indonesia. (2013). Economy and Trades, http://www.bps.go.id/menutab.php?tabel=1&kat=2&id_subyek=04, (1 August 2013)
- Wirahadikusumah, R.D., Sapitri, Susanti, B., Soemardi, B.W. (2013). Strategic Issues on Toll-road Procurement under PPP Scheme (in Indonesia). Jurnal Teknik Sipil, Institut Teknologi Bandung, Vol.20-No.3, 2013. Indonesia.
- Pribadi, K.S. (2014). Harmonization Framework of Indonesian Construction Industry (in Indonesian). Indonesian Construction Series Yearbook 2014. Ministry of Public Works (in printing).

HARMONIZING THE INDONESIAN CONSTRUCTION RESOURCES SUPPLY CHAIN

ASIA CONSTRUCT CONFERENCE 2014, HONG KONG, 13-14 NOV 2014



Muhamad Abduh and Krishna S. Pribadi

2

Introduction

Background

Background (1)

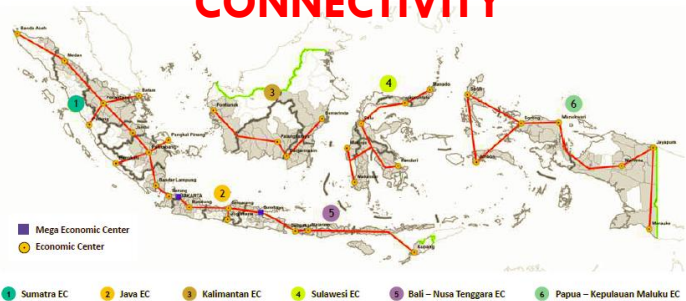
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- Need **of infrastructure development** to maintain **economic growth > 6% per year**.
- In its medium-term master plan (RPJM) and the economic acceleration master plan (MP3EI):
 - High priority to build sustainable infrastructures to increase the **connectivity** of the Six Indonesian Economic Corridors; Sumatera, Java, Borneo, Celebes, Bali-Nusa Tenggara, and Moluccas-Papua.
 - Investment of 4,012 Trillion Rupiah in total until year 2025, about 1,786 Trillion Rupiah investment for infrastructure
- National Logistic System Development Master Plan (Sislognas) established in 2012.
 - Vision: “locally integrated, globally connected for national competitiveness and social welfare”
 - Objectives: to reduce logistic cost and to increase logistic services for elevating national product competitiveness; to guarantee the availability of primary commodities all over the Indonesian region with affordable prices; and to prepare the national logistic to face the integration of ASEAN logistic services in 2015.
- The **construction industry** holds an important and strategic role in the Sislognas realization, through the provision of **sustainable infrastructure**.

CONNECTIVITY

Background

4



Construction Industry



150 Billions USD
Infrastructure investment
(Mid term plan and MP3EI)



Maintain
>6 % Economic Growth

National Logistics
System

Background (2)

5

- Challenge for national construction industry : to build infrastructure within limited availability of supply chain of resources.
- The need to harmonize its supply chain of resources in supporting the construction of infrastructure investments.

6

Construction Resources

1. Contractors
2. Labor Forces
3. Construction Materials
4. Construction Equipment
5. Finance
6. Technology and Know-how
7. Land

1. Construction Statistics

7

- The Indonesian construction industry
 - ~ 6.5% of GDP
 - ~ 6% of employment

(Statistics Indonesia 2013)
- Number of registered contractors 117,042 (Husaini, 2013)
 - Large : 941 or 0.8%
 - Medium: 11,002 or 9.4%
 - Small: 105,099 or 89.8%
- Total value of construction Rp. 324 T (2012)
- 85% performed by large contractors.
- Concentration ratio for 8 biggest contractors (CR8) : 0.2
- Fragmentation occurs in Indonesian construction industry.

Problems in Contractors' Supply Chain (CSC)

8

- No competition among existing contractors' supply chains;
- Members of supply chains performing the execution of the project are different from those proposed in the bids;
- No natural localization of contractors in Indonesia;

Proposed Policies to Strengthen CSC (1)

9

1. Advising the construction projects' owners to proportionally consider the existing supply chain related to their projects in preparing their work packages with the main objective to achieve the values demanded by the owners.
2. Promoting the elimination of regulation that currently limits the numbers of eligible sub-contractors in a construction project.
3. Promoting the implementation of Supply Chain Management (SCM) practices in construction firms, especially for big-size and the state owned contractors.

Proposed Policies to Strengthen CSC (2)

10

4. Forcing the big size contractors to implement partnering with local contractors in delivering their construction projects, to empower the local contractors, and to include the local contractors in their SCM systems.
5. Promoting the medium and small size contractors to become specialists rather than generalist contractors and practicing under big size contractors' SCM.
6. Providing productive and conducive subcontracting environment and mechanisms to protect the subcontractors properly in their businesses.

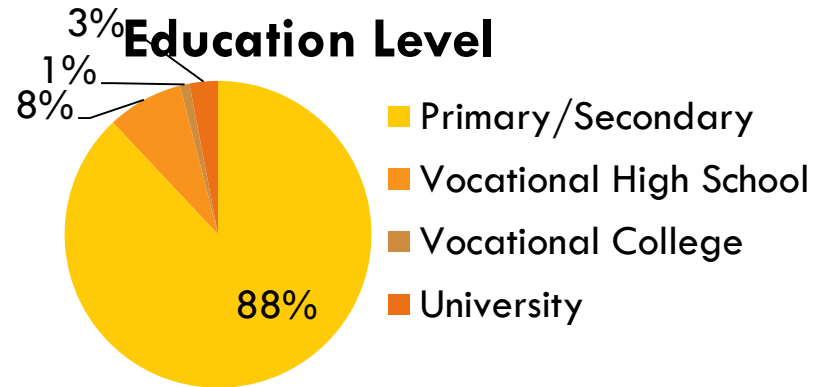
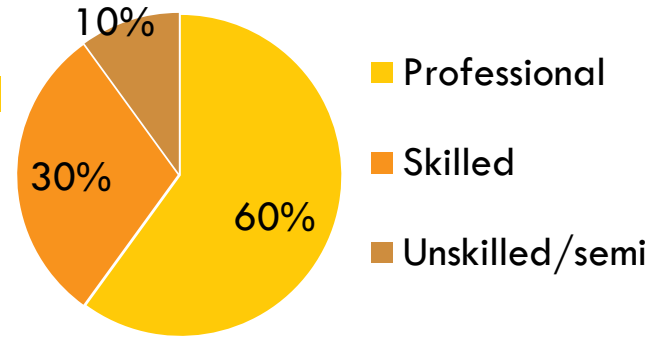
2. Labor Forces

11

Construction workers :

- 6.8 million (2012) (= 6.13% of national labor forces)
- 7.4 million (2014)
- Average annual growth: 5 %;
- Only 10% certified.

Workers Qualification



Problems in Labor Forces

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- High growth of the construction industry has created more demand for construction labors than what are currently available.
- According to the Indonesian construction law, only certified professionals and skilled workers are allowed to work in construction.
- Due to the limited availability of certified personnel, there are practices of renting engineers' and skilled labors' certificates from other regions (particularly Java regions) just for administration purposes carried out by bidders to be qualified for the works, but when the contract is awarded the actual works are conducted by local engineers without any certifications.

Efforts to Improve Labor Forces Competencies

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- Gol demands adequate construction worker's competencies to ensure quality of construction products → requirement of professional and skilled labor certifications.
- Standardized working competencies, competency-based trainings, and certification programs.
- Accelerated Construction Training Program (ACTP) 2010-2014 to produce 3 million certified construction workers by the end of 2014.
 - Training programs conducted by several agencies, e.g. Ministry of Public Works, Ministry of National Education, Indonesian Construction Services Development Board (LPJK), Ministry of Manpower, and other government agencies.
 - Professional associations expected to develop professional competencies by encouraging, providing subsidy, deliver training for their members.
 - Unfortunately, until the paper was written, the progress of ACTP is still unsatisfactory

3. Construction Materials

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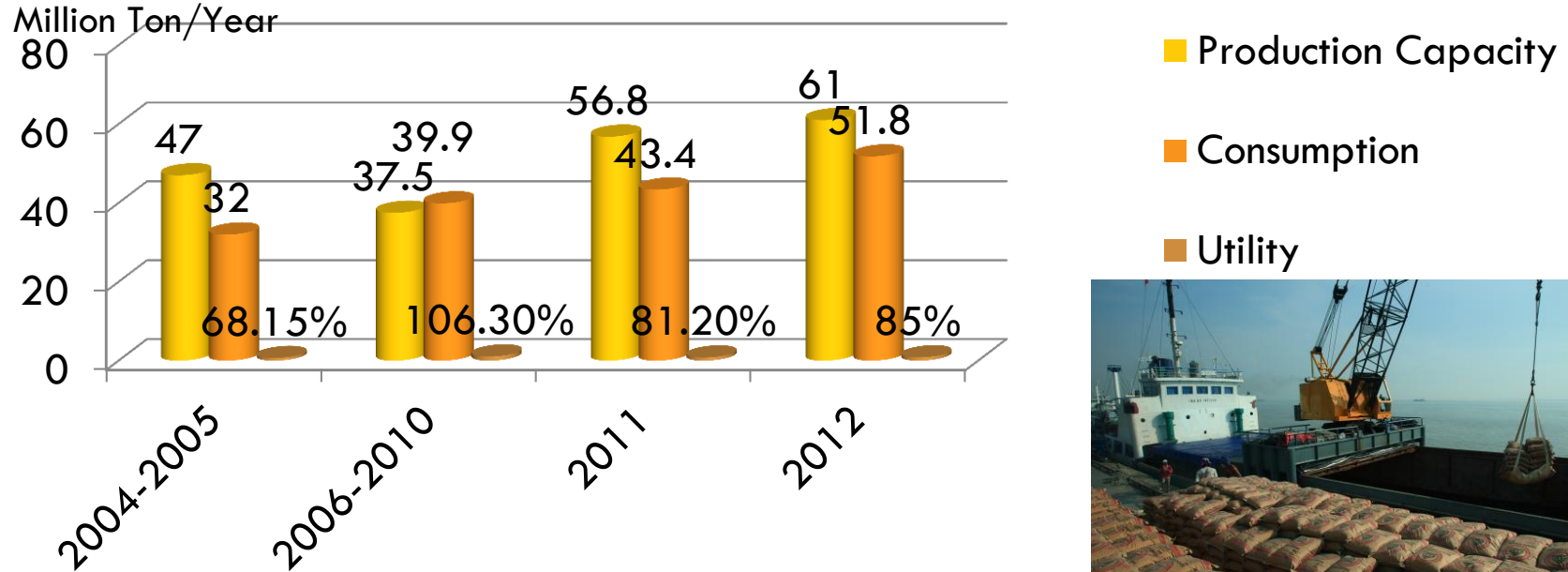
- The Indonesian government has been conducting research in identifying the structures of material supply chain in construction.
- Strategic Materials: cement, steel, and asphalt (based on their supply chain' structures).
- The challenges:
 - More robust estimated demands of construction material in terms of quantity, specification, location, and time needed;
 - More supplies to support the concentration of demands during certain time;
 - Improvement of infrastructure to support limited accesses for material distribution to wider and remote regions; and
 - Development of material catalog for consumers.

3.1. Cement

15

- Cement consumption increases as Indonesia is developing its economy.
- National cement consumption per capita 151 kg (2008)
- Gypsum, as raw material for cement production, is still imported.
- Utility of national cement producers : ~ 85%
- Supply chain cannot support the demands of cement all over the country.
- In remote locations (the eastern regions of Indonesia), the cement prices are very high due to limited access, especially for Ordinary Portland Cement (OPC).
- OPC is being replaced by Portland Pozzoland Cement (PPC) and Portland Composite Cement (PCC).

Cement Production Capacity & Consumption



3.2. Steel

□ Raw materials for steel :



Iron ore deposit
estimated 1 billion ton
Exported, no ore smelter



Iron pellet
100% imported
2 million ton/year



Scrap 80% imported

- Consumption 39 kg/capita (2008)
- In 2012 :
 - Production capacity 18.9 million ton
 - Consumption 13.3 million ton
 - → Utility = 78 %
 - But imported 7.2 million ton
 - → national utility = 113 %

Problems and Efforts

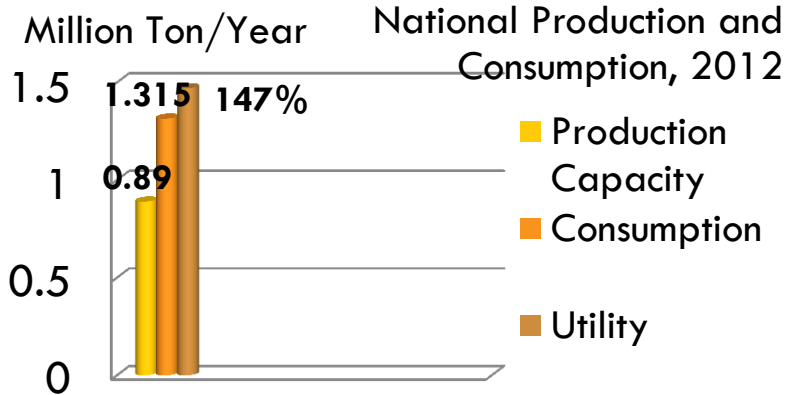
18

- ❑ Steel production is heavily depending on importation.
- ❑ Construction industry affected every year :
 - ❑ Volatile exchange rate
 - ❑ High peak demand during the fourth quarter of the year due to high construction activity
- ❑ Growing demand for high tensile strength steel, but no capacity development
- ❑ Efforts to improve the support of steel industry to the construction:
 - ❑ Development of steel demands data base;
 - ❑ Prohibiting importation of minerals (iron ores);
 - ❑ Development of steel catalog; and
 - ❑ Cooperation between construction steel supply chain members.
- ❑ Mineral law No.4/2009: prohibition of exporting raw mineral without processing → need to develop smelters

3.3. Asphalt

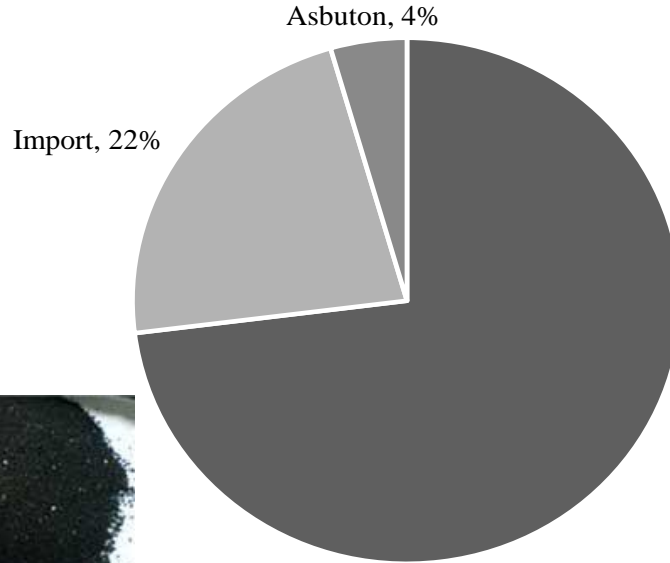
- Raw materials for asphalt/bitumen : crude oil and natural bitumen.
- Asphalt made from crude oil residue most widely used in Indonesia.

- Buton Asphalt or Asbuton : Natural bitumen from Buton island
- Asbuton deposit: ~600 million ton of rock asphalt, asphalt content 5~30%.
- Limited usage of natural bitumen in Indonesian roads ~5%



Asphalt Production Capacity

20



Pertamina, 73%

Problems and Efforts

21

- Advancement of oil refinement technology reduces the quantity and quality of residue , compromising the supply of asphalt eventually.
- Indonesian oil production is decreasing, nowadays Indonesia imports more crude oil to support the national demand.
- The Indonesian government tries to increase the usage of natural bitumen.
- One of major challenge : promoting wider use of Asbuton :
 - Similar effort in 2006 without any significant achievement.
 - The available technology for fully extracting the asphalt in economic scale of production is yet to be developed.

4. Construction Equipment



22

- 30% manufactured by local industry, local content ~50%.
- High performance components and main engine still imported.
- In 2012,
 - national production capacity: 150.000 units. T
 - consumption 210.000 units;
 - utility > 100%.
- 76.000 units are located in Jakarta
- Equipment sale growth 30% (2011)
- Construction industry consumes only 13% ~ 20%
- 65 heavy equipment re-conditioning firms , decreasing due to import ban on used equipment.
- Other construction and special equipment (tower crane, tunnel boring machine, launching gantry, etc.) not monitored specifically



5. Finance

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- To support the construction industry, money related services are financing, bond, and insurance (banks and insurance companies supporting construction firms, suppliers and sub-contractors in their operations)
 - The Indonesian Eximbank (LPEI), an export credit agency : operation not limited to construction firms that will operate in a foreign country, but also to construction firms that operates construction projects in Indonesia.
 - The Indonesia Infrastructure Guarantee Fund (IIGF or PT. PII in Indonesia) : established as a state-own company, as a single window for appraising, structuring, and providing guarantees for Public-Private Partnership (PPP) infrastructure projects.
 - The Government Investment Center (GIC or PIP in Indonesian): provides soft-long-term loan to any local government that need funding for developing their infrastructure. Local government installs the debt yearly after the grace period. The loan will be integrated into the local government's budget.

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- There is no formal or official effort by the government in monitoring those resources.
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7. Land

- Based on the experience of 35-year building 792.9 km toll-roads in Indonesia, the Indonesian government realized that land acquisition is a major constraint.
- Despite the enactment of several regulations to streamline the land acquisition processes for building infrastructure, almost all infrastructure projects were still deferred due to the issues of the effectiveness of the regulations, law enforcement, and corruption prevention related to the land acquisition processes.
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- The effectiveness of those regulations is yet to be proven.
- No study yet reporting the implementation of those regulations.

Harmonization Efforts

Harmonization of the construction resources
supply chain

Harmonization of Construction Resources Supply Chain

27

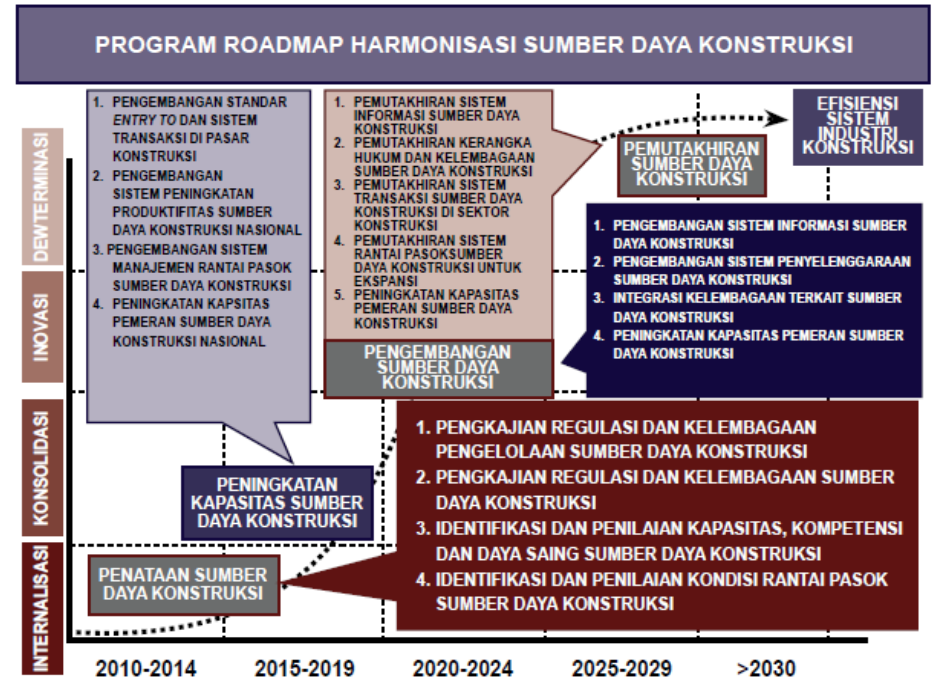
- Objectives:
 - To guarantee the availability of construction resources for construction industry; in terms of quantity, quality, location, and time;
 - To improve the efficiency of construction industry; and
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Roadmap for Harmonization

28

- The government has already put attention to it by establishing a special steward body for the harmonization of construction resources, the Center for Investment and Resources (Pusbin SDI), in the Construction Development Agency of the Ministry of Public Works.



Coordination Forum

29

- A coordination forum has been established with members coming from government agencies related to construction supply chain, associations of manufacturers, associations of contractors, associations of suppliers and academia.
- The forum encourages the members to share information related to demands and supplies of construction resources.
- Some raising issues related to strategic plan of harmonization as well as immediate actions to be taken are discussed and solved.
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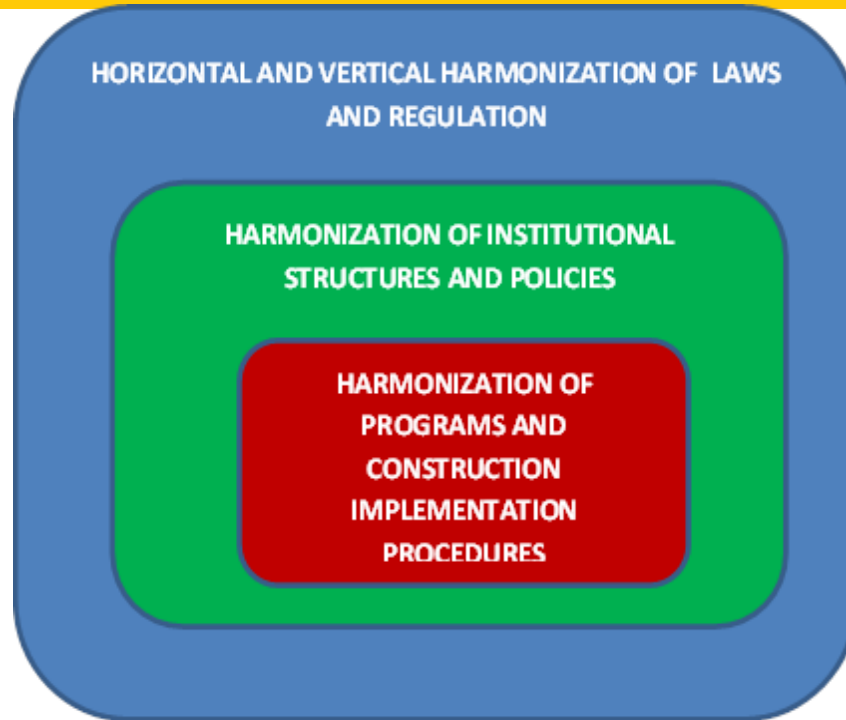
Challenges to the Forum

30

- ❑ Leadership role of the Center for Investment and Resources in the forum.
- ❑ Openness of each member in sharing information regarding supply and demand of particular resources.
- ❑ Willingness to work together with the same objective between members of the forum.
- ❑ Synchronization of regulation related to particular construction resources with a perspective of supply chain.
- ❑ Strong commitments from all of members of the forum in delivering the objectives of harmonization of construction supply chain.
- ❑ Continuous improvement for all the processes related to the effort of harmonizing the construction supply chain.
- ❑ Sharing information to the public as a part of accountability of the forum.

Framework for Harmonizing the National Construction Industry

31



Conclusions

Acknowledgement

Conclusions

- Indonesian government has been keen to implement supply chain management in construction for answering latent problems faced by the construction industry, especially in ensuring the availability of construction resources; in terms of quantity, quality, location, and time.
- Problems and challenges in managing construction supply chain in Indonesia have been identified. The government tried to minimize them since they will cause poor performance of the Indonesian construction industry.
- An effort to harmonize the construction supply chain in Indonesia has been conducted since the last two years by the use of a coordination forum of construction supply chain.

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THANK YOU

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