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Country Report (Japan)

I. Overview

Although Japan's economy had slowed down due to global economic confusion and the Great East Japan Earthquake of March 2011, a recovering trend had been apparent with the economy boosted by subsequent public investment centering on recovery/reconstruction works. A downturn in growth is expected for FY2014, due to the slowdown in consumer spending resulting from consumption tax increases that took effect in April, the rebound from last-minute demand in residential investment, and reduced public investment even with the inclusion of the FY2013 supplementary budget. Although growth in FY2015 is forecast to match the level of growth in FY2014, while consumer spending will increase due to further consumption tax increases scheduled for October 2015 and residential investment will increase due to the effects of last-minute demand in the first half of the fiscal year, as rebounds in the latter half of the fiscal year will result in decreases, efforts that will lead to continuous economic growth are anticipated.

After peaking at approximately ¥84.0 trillion in FY1992, construction investment in Japan fell rapidly, and has, in more recent years remained at around half the peak investment level of about ¥40 trillion – ¥50 trillion. Although difficult times continue for the construction industry, construction investment is gradually picking up due to recoveries in public and private investment for recovery/reconstruction following the Great East Japan Earthquake. For private non-residential construction investment, there is a nationwide trend of improvement in office space vacancy rates/rents, with a year-on-year increase of 5.6% due to expected increases in construction starts (floor area), and with the added contribution from capital investment by civil engineering infrastructure related companies, an overall year-on-year increase of 5.2% is anticipated. While there is a negative year-on-year growth rate for government construction investment in FY2014, due to the FY2013 supplementary budget, an investment amount greater than that of FY2012 is anticipated.

The recent status of the construction industry in Japan can be summed up as follows.

①There was a slight increase of 0.2% in the number of licensed construction companies over the same month of the previous year, but in comparison to the peak in 2000, this figure is a reduction of ▲21.7%.

②The number of persons employed in the construction industry shifted to a declining trend, and FY2013 showed a declining year-on-year trend centering on steel working businesses.

③Japan's overseas construction orders received was affected by the worldwide recession and dropped to ¥697 billion in FY2009. However, this increased to ¥1,602.9 billion in FY2013.

④Prices for construction materials continued to soar, however, even with repeated wild fluctuations, prices have recently tended towards staying high indicating a return to calmer markets.

II. Macro-economic review and forecast

1. Overview of Japan's economy (Figures 1, 2)

Due to the Great East Japan Earthquake of March 2011, Japan's economic growth rate temporarily fell to 0.3% in FY2011. However, the subsequent upward trend has continued, and in FY2013, consumer spending and residential investment resulting from last-minute demand prior to increases in consumption tax drove the economy, and with subsequent last-minute demand reaching full momentum by the end of the fiscal year, the economic growth rate reached 2.3%.

With regards to future economic trends, the slowdown in the recovery of Asian economies such as China and the deteriorating situation in the Middle East have been mentioned as downward swing risk factors, and a delayed economic recovery due to a downturn in last-minute demand prior to increases in consumption tax is expected.

As there will be a slowdown in growth potential in response to last-minute demand in residential investment, etc. in FY 2014, private final consumption expenditure will decline by ▲0.6%. Meanwhile, consumer spending will pick up and with signs of improvement in opinions on corporate outlook, a 5.9% increase in private corporate facilities is expected. In addition, while public fixed capital formation will decline by ▲7.7% together with the decrease in earthquake recovery/reconstruction works, economic recovery is anticipated, and a year-on-year real GDP increase of 0.9% is forecast for FY2014.

Figure 1　Macroeconomic Trends (FY)

(Unit: Billion yen)

Fiscal year	1995	2000	2005	2010	2011	2012	2013	2014 (Forecast)	2015 (Forecast)
Real GDP	459,058	476,723	507,158	512,424	514,148	517,526	529,320	533,895	540,890
(YoY change)	2.7%	2.0%	1.9%	3.4%	0.3%	0.7%	2.3%	0.9%	1.3%
Real private final consumption expenditures	265,891	275,056	292,579	299,724	303,910	308,450	316,363	314,585	316,758
(YoY change)	2.3%	0.3%	1.9%	1.6%	1.4%	1.5%	2.6%	-0.6%	0.7%
(Contribution rate)	1.3	0.2	1.1	0.9	0.8	0.9	1.6	-0.3	0.4
Real government final consumption expenditures	73,617	83,960	92,363	97,886	99,079	100,594	102,436	103,901	104,127
(YoY change)	4.3%	4.8%	0.4%	2.0%	1.2%	1.5%	1.8%	1.4%	0.2%
(Contribution rate)	0.6	0.8	0.1	0.4	0.2	0.3	0.4	0.3	0.0
Real private housing	23,609	20,080	18,345	12,534	12,936	13,619	14,918	14,025	14,099
(YoY change)	-5.7%	-0.1%	-0.7%	2.2%	3.2%	5.3%	9.5%	-6.0%	0.5%
(Contribution rate)	-0.3	0.0	0.0	0.1	0.1	0.2	0.3	-0.2	0.0
Real private corporate facilities	60,326	64,986	70,599	64,876	68,001	68,516	70,326	74,455	77,050
(YoY change)	3.1%	4.8%	4.4%	3.8%	4.8%	0.8%	2.6%	5.9%	3.5%
(Contribution rate)	0.5	0.7	0.6	0.5	0.6	0.1	0.4	0.8	0.5
Real public fixed asset formation	41,704	35,071	24,113	20,715	20,056	20,315	23,386	21,586	18,694
(YoY change)	6.7%	-6.1%	-6.7%	-6.4%	-3.2%	1.3%	15.1%	-7.7%	-13.4%
(Contribution rate)	0.6	-0.5	-0.3	-0.3	-0.1	0.1	0.7	-0.3	-0.5
Real inventory increase	1,291	341	807	-136	-1,478	-1,922	-3,996	-3,117	-3,067
(YoY change)	-241.5%	-110.2%	-46.3%	-97.3%	988.9%	30.1%	107.9%	-22.0%	-1.6%
(Contribution rate)	0.6	0.8	-0.1	1.1	-0.5	-0.1	-0.4	0.2	0.0
Real financial services net exports	-4,509	-2,087	8,349	16,847	11,974	8,359	7,068	9,642	14,410
(YoY change)	596.5%	102.6%	56.0%	43.8%	-28.9%	-30.2%	-15.4%	36.4%	49.4%
(Contribution rate)	-0.6	0.0	0.6	0.8	-1.0	-0.8	-0.5	0.5	0.9
Nominal GDP	504,594	510,835	505,349	480,233	473,671	472,645	481,508	495,906	506,203
(YoY change)	1.8%	0.8%	0.5%	1.3%	-1.4%	-0.2%	1.9%	3.0%	2.1%

Source: *Construction and Economic Forecasts* (RICE) for 2014 and 2015, Annual Report on National Accounts(Cabinet Office) for 1995-2013
Note: Real values reflect 2005 prices.

2. Major Economic Indicators

Figure 2 List of Major Economic Indicators

	2009	2010	2011	2012	2013	(Forecast) 2014
GDP (Real,(2005prices), billion yen)	495,491	512,424	514,148	517,526	529,320	533,895
GDP (Nominal, billion yen)	473,934	480,233	473,671	472,645	481,508	495,906
GDP growth (%)	-2.0%	3.4%	0.3%	0.7%	2.3%	0.9%
Agriculture, forestory, and fishery	-9.4%	-1.0%	2.0%	0.3%	－	－
Manufacturing	-17.7%	19.6%	-2.5%	-0.5%	－	－
Services	-4.7%	0.0%	0.6%	2.8%	－	－
Mining	-43.6%	5.9%	1.1%	-1.3%	－	－
Construction	-2.0%	-2.3%	0.9%	1.0%	－	－
Demographic Indicators						
Population (thousands)	128,032	128,057	127,799	127,515	127,298	127,116
Population growth rate (%)	0.27%	0.02%	-0.20%	-0.22%	-0.17%	-0.14%
Total labor force (thousands)	66,420	66,290	65,768	65,552	65,776	65,830
Labor force growth rate (%)	-0.48%	-0.20%	-0.79%	-0.33%	0.34%	0.08%
Unemployment rate (%)	5.2%	5.0%	4.5%	4.3%	3.9%	3.6%
Inflation rate (%)	-1.4%	-0.7%	-0.3%	0.0%	0.4%	2.0%
Financial Indicators						
Interbank interest rate (%)	0.46	0.34	0.34	0.31	0.22	0.21
Short-term interest rate (%)	0.09	0.08	0.08	0.08	0.07	0.07
Long-term interest rate (%)	1.36	1.19	1.15	0.86	0.72	0.61
Exchange rate against US$(yen)	93.53	87.77	79.78	79.79	97.60	102.34

Source: Construction and Economic Forecasts (RICE, July 2014), Annual Report on National Accounts (Final Report for 2012, Cabinet Office), Financial and Economic Statistics Monthly (Bank of Japan), Ministry of Internal Affairs and Communications website.

Notes:

1. The GDP figure for FY2014 is a forecast.Real values: 2005 prices.
2. Population figures are estimates as of October 1 each year. The FY2014figure is an average value for five months.
3. The workforce population and unemployment rates are average values for 12 months. For 2014, the figure is an average value for three months.
4. The inflation rate is a percentage as compared with the previous year's consumer price index. For FY2014, the figure is the rate of increase between FY2013 and July 2014.
5. Interbank Interest rates for 2014 are as of the end of August. Others reflect the year-end rates.
6. Short-term interest rates are calculated using the average published interest rate for domestic commercial paper.
7. Long-term interest rates are the rates on 10-year government bonds.
8. Exchange rate for 2014 is as of the end of August. Others are annual averages.

III. Overview of the Construction Industry

1. Construction Investment Outlook (Figure 3)

Construction investment in Japan for FY2013 (nominal: same hereinafter) was approx. ¥48.7 trillion, of which approx. ¥20.6 trillion was government investment and approx. ¥28.1 trillion was private investment. All three showed significant decreases in comparison to peak levels, with construction investment at ▲42.0% (peak FY1992), government investment at ▲41.5% (peak FY1995) and private investment at ▲49.6% (peak FY1990).

Construction industry forecasts announced in July 2014 state that construction investment for FY2014 is expected to decrease by 1.8% from the previous fiscal year to ¥47.86 trillion.

While government construction investment will be ▲5.1% from the previous year in reaction to the FY2012 supplementary budget, with the emergence of the effects of the "15-month budget", formulated through the combination of the FY2013 supplementary budget and the FY2014 initial budget, investment amounts exceeding FY2012 are forecast.

For private residential investment, while the continuation of rental housing starts as tax-saving measures against increases in inheritance tax that will take effect from 2015 is assumed, an unavoidable overall decrease in units started is expected due to a downturn in last-minute demand for owner-occupied housing, with forecasts of ▲8.1% year-on-year for housing starts and ▲2.8% for private residential investment.

For private non-residential investment, as there will be a year-on-year increase in construction starts (floor area) for FY2014, private non-residential construction investment will show a year-on-year increase of 5.6%, and with the added contribution from capital investment by civil engineering infrastructure related companies, an overall year-on-year increase of 5.2% in private non-residential construction investment is forecast.

Figure 3　Construction Investment Forecast

(Unit: ¥1 billion)

FY	1990	1992	1995	2011	2012	2013	2014 (Forecast)	2015 (Forecast)
Nominal construction investment	81,440	83,971	79,017	43,292	44,200	48,720	47,860	46,020
(YoY change)	11.4%	1.9%	0.3%	3.3%	2.1%	10.2%	-1.8%	-3.8%
Nominal government construction investment	25,748	32,334	35,199	18,611	18,690	20,600	19,540	17,160
(YoY change)	6.0%	12.8%	5.8%	3.5%	0.4%	10.2%	-5.1%	-12.2%
(Contribution rate)	2.0	4.4	2.5	1.5	0.2	4.3	-2.2	-5.0
Nominal private residential construction	25,722	22,663	24,313	13,375	14,090	15,740	15,300	15,580
(YoY change)	9.3%	-2.0%	-5.2%	3.1%	5.3%	11.7%	-2.8%	1.8%
(Contribution rate)	3.0	-0.6	-1.7	0.9	1.7	3.7	-0.9	0.6
Nominal private non-residential construction	29,970	28,974	19,505	11,307	11,420	12,380	13,020	13,280
(YoY change)	18.4%	-5.4%	-1.8%	3.1%	1.0%	8.4%	5.2%	2.0%
(Contribution rate)	6.4	-2.0	-0.4	0.8	0.3	2.2	1.3	0.5
Real construction investment	84,221	83,603	77,935	40,771	42,208	45,460	43,310	41,090
(YoY change)	7.6%	0.6%	0.2%	1.8%	3.5%	7.7%	-4.7%	-5.1%

Source: *Construction and Economic Forecast* (RICE), *Construction Investment Forecasts* (MLIT).
Notes:
1. Real values reflect 2005 prices.
2. Private non-residential construction investment = private non-residential building investment + private civil engineering investment.

2. Construction Companies

The number of licensed construction companies in Japan as of end March 2014 was 471 thousand, an increase of 0.2% over the same month of the previous year. (Figure 4)

In comparison to end March 2000, when the number of licensed construction companies was at its highest, there has been a decrease of 130,000 companies (▲21.7%).

Looking at the number of licensed construction companies by capital classification, the highest proportion, 38.0%, is comprised of "Corporation with ¥3 million up to¥10 million in capital", followed by "Corporation with ¥10 million up to¥20 million in capital (23.9%)", and then " Sole proprietor (19.4%)".

Figure 4　No. of Construction Companies, and Composition Size

Year	2000		2011		2012		2013		2014	
	(thousand)	Percent of total	(thousand)	Percent of total	(thousand)	Percent of total	(thousand)	Percent of total	(thousand)	Percent of total
No. of registered contractors (total)	601	100.0%	499	100.0%	484	100.0%	470	100.0%	471	100.0%
Breakdown of registered contractors by size classification										
8 Sole proprietor	158.2	26.3%	102.4	20.5%	97.0	20.1%	91.8	19.5%	91.2	19.4%
7 Corporation with less than ¥3 million in capital	1.0	0.2%	7.2	1.4%	8.4	1.7%	9.7	2.1%	11.1	2.4%
6 Corporation with ¥3 million up to ¥10 million in capital	195.3	32.5%	186.2	37.3%	181.9	37.6%	178.2	37.9%	179.0	38.0%
5 Corporation with ¥10 million up to ¥20 million in capital	166.0	27.6%	123.6	24.8%	118.4	24.5%	113.5	24.2%	112.7	23.9%
4 Corporation with ¥20 million up to ¥100 million in capital	74.1	12.3%	73.6	14.8%	72.3	14.9%	71.0	15.1%	71.1	15.1%
3 Corporation with ¥100 million up to ¥1 billion in capital	4.8	0.8%	4.4	0.9%	4.3	0.9%	4.2	0.9%	4.2	0.9%
2 Corporation with ¥1 billion up to ¥10 billion in capital	1.6	0.3%	1.0	0.2%	1.0	0.2%	1.0	0.2%	1.0	0.2%
1 Corporation with ¥10 billion or more in capital	0.4	0.1%	0.4	0.1%	0.4	0.1%	0.4	0.1%	0.4	0.1%

Source: *Survey of on the Number of Licensed Construction Companies* (MLIT)

The number of construction consultant businesses is shown in the figure below. (Figure 5)

Figure 5　No. of Registered Construction-Related Businesses
(by Business Type and Net Registered Number)

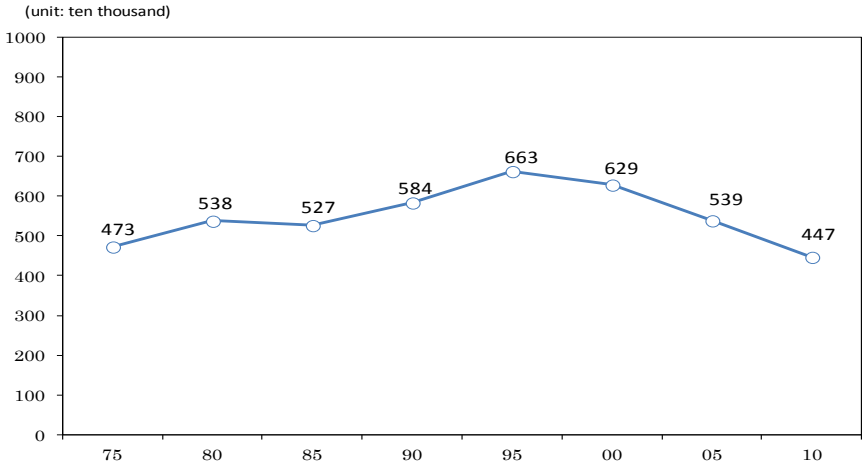
Business Type	Fiscal Year[2]	2010	2011	2012	2013	2014
Surveying[1]	No. of registered companies	12,974	12,695	12,566	12,436	12,272
	YoY change (%)	-2.6	-2.2	-1.0	-1.0	-1.3
Construction consulting[1]	No. of registered companies	3,952	3,991	3,935	3,941	3,945
	YoY change (%)	-1.0	1.0	-1.4	0.2	0.1
Geological surveying[1]	No. of registered companies	1,286	1,289	1,265	1,263	1,259
	YoY change (%)	-1.5	0.2	-1.9	-0.2	-0.3
Net number of companies	No. of registered companies	14,605	14,200	13,951	13,773	13,714
	YoY change (%)	-3.0	-2.8	-1.8	-1.3	-0.4

Source: Registration Status of Construction-Related Companies (MLIT)
Notes:
1. Including companies with multiple registrations.
2. As of the end of March in each fiscal year.

3. Employees and Construction Labor

The number of construction industry employees in 2010 was 4.47million, a decrease of ▲32.6% in comparison to the 6.63million in 1995. (Figure 6)

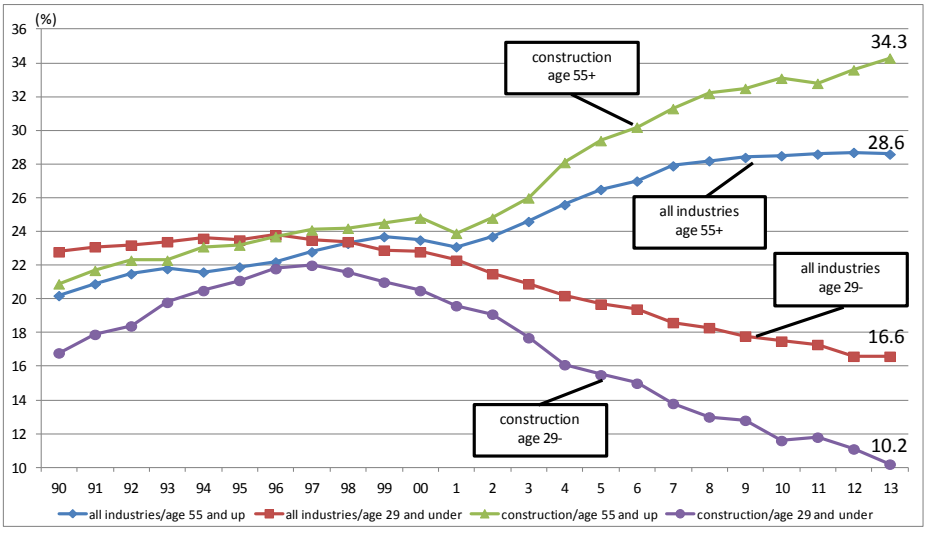
Figure 6　Number of Construction Industry Employees



Source: National Census (Ministry of Internal Affairs and Communications)

Looking at trends in age composition among construction industry employees, in 2013, about 34% of employees were aged 55 or higher, while about 10% were aged 29 and under, indicating that aging in the employee population is progressing. In addition, the percentage in the young adult age group has dropped significantly, and the passing of skills to the next generation has become a major issue. (Figure 7)

Figure 7　Age Composition of Construction Industry Employees



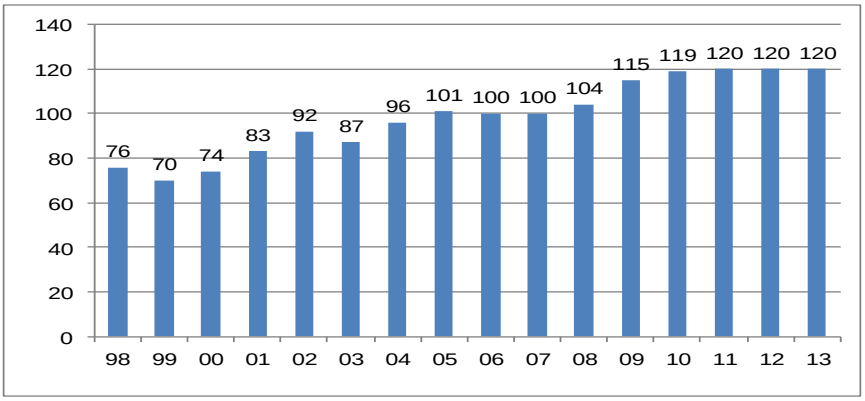
Source: *Labour Force Survey* (Ministry of Health, Labour and Welfare)

4. International Transactions in the Construction Market

① Overseas construction companies in Japan (Figure8)

As of FY2013, there were 120 overseas construction companies (overseas corporations and Japanese corporations with over 50% foreign capital) holding construction licenses in Japan.

Figure 8　No. of International Construction Companies Holding Construction Licenses in Japan

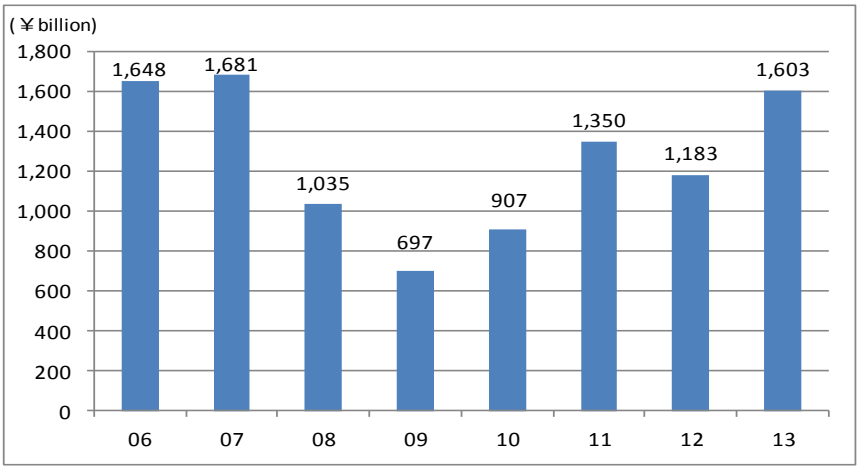


Source: MLIT

② Japanese construction companies overseas (Figure 9)

The value of Japan's overseas construction orders received exceeded ¥1 trillion for the first time in 1983. Since then, this remained at around ¥1 trillion for about twenty years, and in FY2007, the value of orders received reached the highest recorded value of ¥1.6813 trillion. With the effects of the global recession, the figure dropped to ¥0.697 trillion in FY2009, but this recovered to ¥1.6029 trillion in FY2013, just shy of the 2007 peak.

Figure 9　Overseas Construction Orders of Japanese Companies



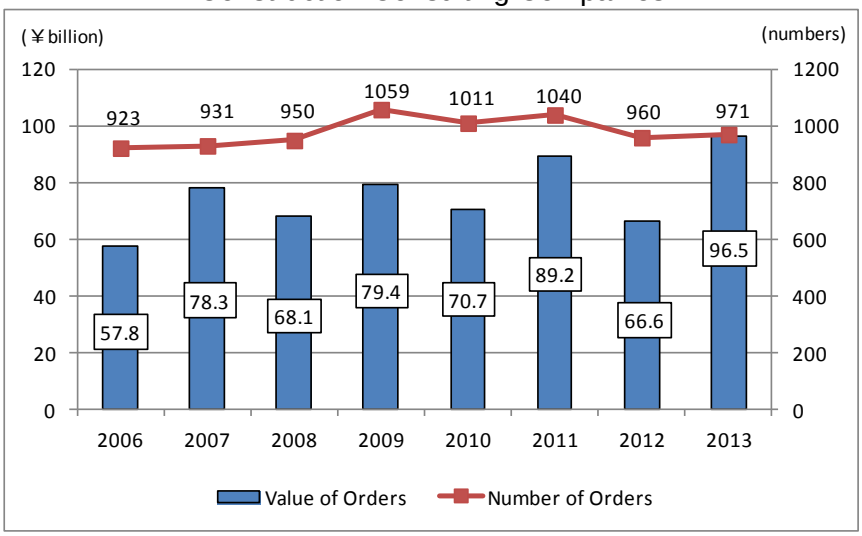
Source: The Overseas Construction Association of Japan. Inc

③ Japanese construction consultant companies overseas (Figure 10)

Regarding the overseas sales of Japanese construction consultant companies, the total value of orders received in FY2013 was the highest ever recorded. The total value of orders received was ¥95.6 billion, a year-on-year increase of ¥29.9 billion, and the number of projects increased by 11 to 971.

When looking only at the number of orders received, FY2013 is weak when compared to the preceding five years, but the increase in orders received for large-scale projects worth over ¥1 billion per project has resulted in a significant increase in the total value of orders received.

Figure 10　Overseas Sales of Japanese Construction Consulting Companies



Source: Infrastructure Development Institute of Japan. Inc

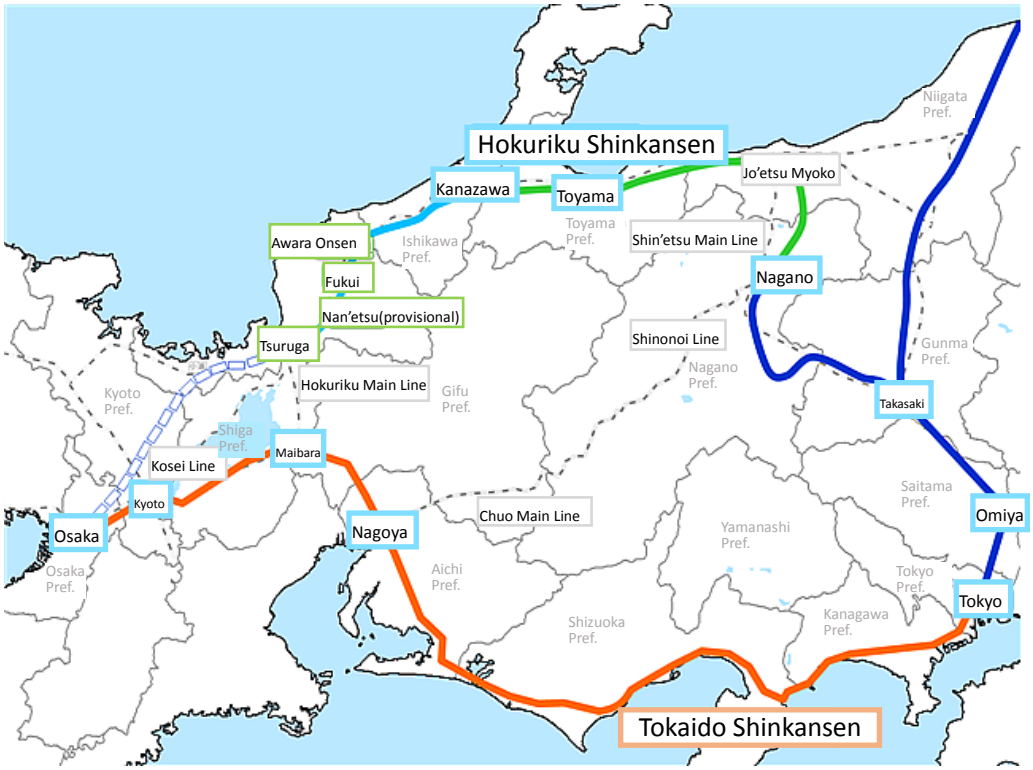
IV. Recent Trends -Maglev Chuo Shinkansen

Introduction

In March 2011, Japan experienced an unprecedented natural disaster in the form of the Great East Japan Earthquake. Although infrastructure was devastated in the immediate aftermath of the earthquake, the rapid pace at which reconstruction work was conducted to secure railway lines and roads needed for transportation of relief supplies and the movement of people and materials remains clear in our memories. Under the "Building National Resilience" initiative, the building of a nation resilient in the event of disasters is required, and as public infrastructure that plays a major role in socioeconomic development and regional revitalization, the railroads need to be constantly maintained at a high level in readiness for rapid responses in the event of natural disasters.

Given these conditions, the Hokuriku Shinkansen route connecting Tokyo to Kanazawa is scheduled to open in March 2015. Travel time from Tokyo to Kanazawa will be about 2 hours and 30 minutes, a reduction of about 1 hour and 20 minutes. Not only will the Hokuriku Shinkansen route serve to develop and revitalize the economy in the Hokuriku region, it is also expected to serve as an alternative transportation route for the Tokaido Shinkansen, connecting the Kanto and Kansai areas in the event of a natural disaster affecting the Tokai region.

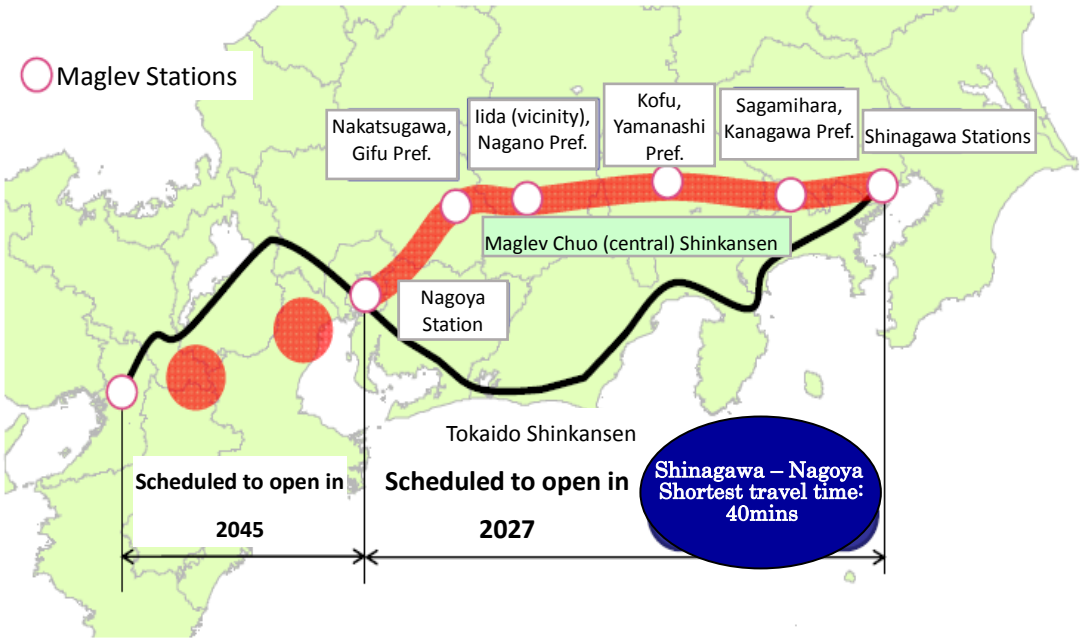
[Hokuriku Shinkansen]



(Source: Fukui Prefecture)

In view of preparations for the anticipated Nankai Trough Earthquake and age-related deterioration of the Tokaido Shinkansen route, the Central Japan Railway Company (JR Tokai) that operates this route, which comprises the main arterial rail line that connects the three major cities of Tokyo, Nagoya and Osaka, has also advocated preparations against future risks through the realization of parallel arterial transportation routes, and is specifically engaged in the realization of a Chuo (central) Shinkansen route that operates the Superconducting Maglev (linear motor-car). This chapter focuses on this huge "Maglev Chuo (central) Shinkansen" project and provides an outline of its economic and environmental aspects.

[Maglev Chuo (central) Shinkansen]



(Source) Ministry of Land, Infrastructure, Transport and Tourism

1. Outline of the Maglev Chuo Shinkansen

The development of the linear motorcar began in 1962 with linear motor propelled levitated railway research. Later, plans based on the Shinkansen Railway Development Act were drafted in November 1973, and following the decision for development by the Ministry of Land, Infrastructure, Transport and Tourism in May, 2011, construction start has been scheduled for around autumn 2014.

The route will begin in Tokyo and end in Osaka, with the line from Tokyo up to Nagoya scheduled to open in 2027 and the line from Nagoya to Osaka scheduled to open in 2045. The Maglev is scheduled to travel underground for 86% of the total distance of 284km from Tokyo to Nagoya, approx. 240km, running at a deep underground depth of over 40m, however, this is considered to be an approach taken to simplify the necessary "noise/vibration" measures and "site acquisition" procedures needed to advance the project.

The Maglev will travel at a maximum speed of 505km/h and scheduled travel time will be approx. 40mins between Tokyo and Nagoya and approx. 1hour and 7mins between Tokyo and Osaka, respectively 50mins and 1hour and 10mins faster than the existing Tokaido Shinkansen travel times. There will be greater convenience in terms of shorter travel times and distances, effectively combining the three metropolitan cities of Tokyo, Nagoya and Osaka into a single mega-city area, thus heightening the efficiency of economic and social activities.

[Maglev Shinkansen Development Outline]

		Tokyo area-Nagoya area	Tokyo area-Osaka area
Running system		Superconducting magnetic levitation	
Scheduled		2027	2045
Travel time	Opening	40mins	1hour7mins
	Current	1hour30min	2hour18min
Length of Line	Opening	286km	438km
	Current	366km	504km
Project Cost		5.5235 trillion yen	*3.6000 trillion yen

*Project cost for Nagoya area-Osaka area

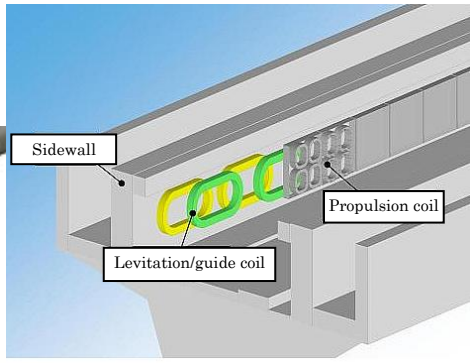
(Source) Created from JR Tokai materials, etc.

2. Running System

The Maglev Chuo Shinkansen, known as the "superconducting[1] maglev", refers to a transportation system that utilizes the magnetic forces of superconducting magnets installed in the carriages and coils attached to the ground to levitate and propel the train.

For the superconducting material, the superconducting maglev uses a niobium-titanium alloy, which is cooled to -269℃ using liquid helium to create a superconductive state. This superconducting technology allows the train to levitate and run at about 10cm off the ground

(Source) JR Tokai



(Source) Maglev Chuo Shinkansen Construction Committee

[1] Superconductivity refers to the phenomenon that occurs when certain types of metals, etc. are cooled to below a certain temperature, at which point electrical resistance becomes zero. When an electrical current is applied once to a coil in a superconductive state, the zero resistance means that this current continues to flow around the coil indefinitely, generating a powerful magnetic field.

Research on running tests are being carried out at the “Yamanashi Maglev Test Line” in Tsuru, Yamanashi prefecture, and a manned running test conducted in December 2003 recorded the world’s fastest speed of 581km/h. In April 2014, the total test runs recorded 1 million km without any major problems.

[Running test]

(Source) Yamanashi Prefectural Maglev Exhibition Center

3. Environmental Aspects

The Environmental Impact Assessment Act came into force in Japan in June 1999.

Environmental Impact Assessment is a system that requires developers to conduct their own surveys, forecasts and assessments regarding the environmental impacts associated with the implementation of a development project, then announce the results of such surveys and listen to the opinions of citizens/local governments, etc. and in view of said opinions, create better plans from the perspective of environmental conservation.

The Maglev Chuo Shinkansen is subject to this system, and for about two years from December 2011, JR Tokai implemented surveys, etc. into environmental impacts and announced the results in the “Chuo Shinkansen (Tokyo-Nagoya) Draft Environmental Impact Assessment”. Subsequently, after gathering opinions from residents and local authorities in towns/cities/prefectures along the route, JR Tokai created the “Chuo Shinkansen (Tokyo-Nagoya) Environmental Impact Assessment”, and submitted this to the Minister of Land, Infrastructure, Transport and Tourism. By holding such advance discussions between the project operators and the towns/cities/prefectures along the route, it became possible to bring about considerations for noise reduction measures and the natural environment, allowing the project to proceed with low impact in terms of environmental load.

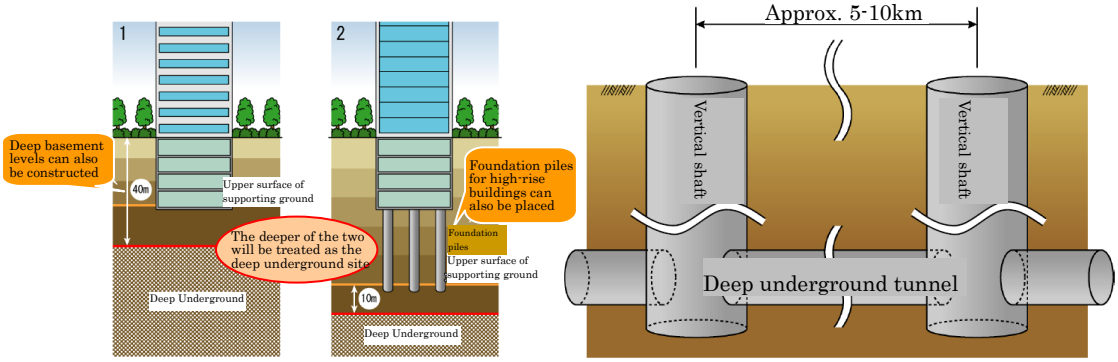
As the basic energy source of the Maglev Chuo Shinkansen is electricity, CO2 emissions are expected to be about one third in comparison to that of aircraft. Furthermore, as an inductive power collection system, which does not generate exhaust gases, looks set to be employed for on-board power, it would seem that the objective is to create a low environmental burden railway.

4. Project Structure

With construction costs from Tokyo to Nagoya at ¥5.5trillion and ¥3.6trillion for Nagoya to Osaka, total costs are estimated to be about ¥9.1trillion. As the site of construction works will be deep underground at a depth of over 40m and will also run through mountainous areas such as the Chuo Alps and the Minami Alps, tunneling works requiring high level skills look set to continue.

JR Tokai is progressing with this project as the sole operator, policy recommendations for the prompt development and utilization of high-speed transportation networks such as the Maglev Chuo Shinkansen were put forward during the growth strategy Cabinet meeting in June 2014, and, tax preferential treatment is put in place with regards to land acquisition.

[Deep underground structure]



(Source) JR Tokai

5. Economic Effects of the Project

The realization of the Maglev Chuo Shinkansen will, along with changes in the flow of people and materials, have a significant effect on consumer spending and corporate production activities, and a variety of economic effects are expected.

A shorter commute time will lead to greater work efficiency for the corporate employees. With regards to housing, if the commute time is less than one hour, then commuter towns between the Tokyo, Nagoya and Osaka areas can easily be developed. For consumer spending, as travel times to other cities will be shorter, traveling for tourism or shopping plans will be easier to arrange, and the scope of activity will expand. Peoples' lifestyles will change, and a ripple effect extending beyond the major city areas to the neighboring regions, creating a chain of demand, invigorating consumer activity and raising the base level of the overall economy, is anticipated.

The "Results of the Survey into the Economic Effects Accompanying the Opening of the Maglev Chuo Shinkansen" published by Osaka prefecture in June 2014, estimates that the nationwide ripple effect over 50 years from the opening of the Tokyo–Nagoya route to be ¥11.7trillion, while for the Tokyo-Osaka route, this figure will be ¥16.6trillion. In addition, for the opening fiscal year, the ripple effect figures for Nagoya and Osaka are ¥526billion and ¥741billion respectively.

[Economic Effects of Maglev Project] (Units: ¥billion)

	Tokyo-Nagoya route opening	Tokyo-Osaka route opening
Nationwide	526	741
Osaka pref.	65	106
Osaka area	96	156
Tokyo area	267	361
Nagoya area	75	98
Prefectures along the route	26	28
Other	62	98

(Source) Osaka prefecture

Conclusion

The "Basic Plan for National Resilience" was approved by the Cabinet in June 2014, and this plan refers to the Maglev Chuo Shinkansen as, "the principal construction company, JY Tokai, will push ahead with development through coordination and cooperation with the state and local authorities". In addition, the "Japan Overseas Infrastructure Investment Corporation(JOIN)" through public/private capital investment was established in October 2014 for promoting private investment in transportation/urban development projects and negotiations with partner countries regarding projects. Companies entering into overseas transportation projects will have access to various supports from the agency in terms of funds and specialist human resources, and the pro-active promotion of entry into overseas markets for transportation projects, etc. is anticipated.

Prime Minister Abe has positioned infrastructure export as a mainstay of his growth strategy, moving for top sales of the Maglev Shinkansen, and JR Tokai is also stepping in line and indicating a will to provide technological support for the countries that have development plans for high-speed railway networks.

Although the opening of the Maglev line is still more than ten years in the future, a variety of support structures are being prepared by the government. The idea is that the promotion and success of future Maglev business through a unified public/private approach, will lead to overseas market development and domestic economic recovery. In the future, the Maglev Shinkansen, which exploits the full range of Japan's unique technologies, is expected to be the world leading infrastructure project.

The 20th

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Japan Theme Paper

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Theme Paper (Japan)

Construction Industry Moving to Secure Human Resources – Recent Policy Initiatives

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1 Overview

The declining trend in Japan's construction investment, which persisted after the peak of FY1992, finally came to an end in 2011, boosted by recovery and reconstruction demand following the Great East Japan Earthquake of March 2011, and shifted to positive since then. Subsequent full-scale implementation of emergency economic measures (FY2012 large-scale supplementary budget) brought about increases in public works, and combined with increases in private sector construction works driven by improved business confidence and employment, the construction industry is currently on the recovering trend.

Meanwhile, the construction industry in Japan, faced with the decline in construction orders and the intensification of competition, has drastically decreased skilled workers. The industry is now faced with rapid aging of employees and a decrease in the youth employees, and the shortage in skilled workers is currently the biggest concern.

If we overlook the current situation, there are concerns that serious problems will arise due to labour shortages, such as infrastructure maintenance and management, quality assurance and disaster response, and so on. Consequently, securing and nurturing a future workforce is recognized as the most urgent issue.

This report looks on the recent trends of construction industry employees[1], and then introduces the outline of the "Projections of Construction Industry Employees", calculated by RICE[2] in October 2013. Finally, this report shows recent efforts of the construction industry and the Japanese governments for securing human resources.

[1] Numbers of construction industry employees are derived from the "Population Census" (Ministry of Internal Affairs and Communications (MIC)). The latest statistical materials are from 2010.

[2] The projection result was introduced by RICE at the "Construction Industry Revitalization Conference" in January 2014. The Chairman of RICE, Mr. Tadao Ogawa, is a member of this conference.

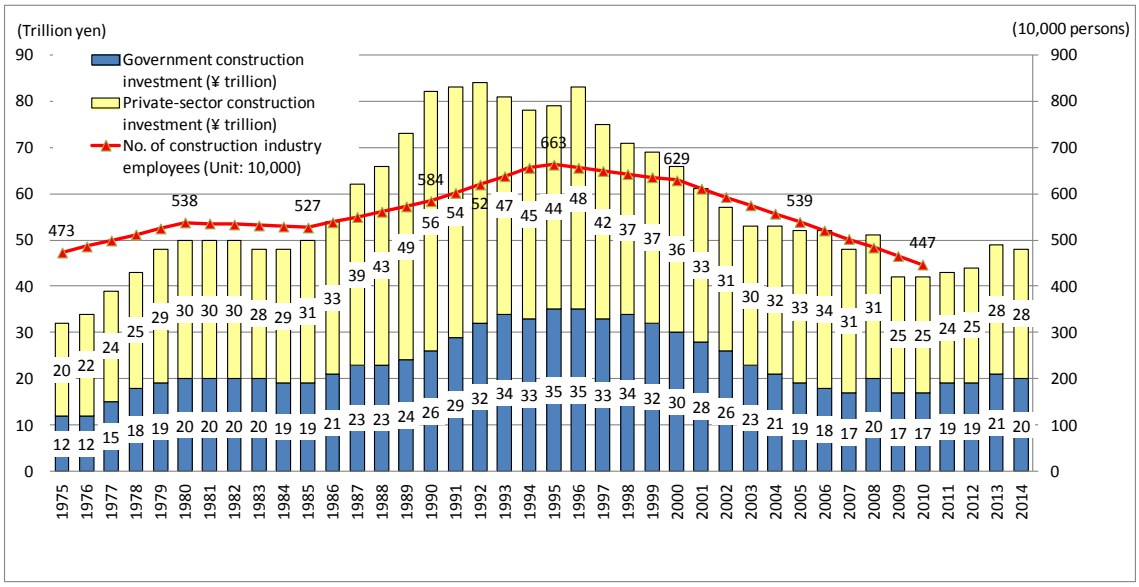
2 Trends in the Construction Industry and Employment

(1) Trends in Construction Investment and Employment

Figure 1 shows the trends in construction investment and construction industry employees. Construction investment continued declining from the peak of ¥84trillion in FY1992, decreased to the half amount of ¥42trillion in FY2010. Since FY2011, reconstruction works of the Great East Japan Earthquake combined with recovery of private construction works pushed up the total amount to ¥49trillion in 2013.

In parallel with the declining trend of construction investment, labour force in the construction industry constantly decreased to 4.5million in 2010, which is less than 32.6% of its historical peak of 1995.

Figure 1 – Trends in Construction Investment and Construction Industry Employees



(Source) Created by this institute based on "Construction Investment Forecasts" (MLIT) and the "Population Census" (MIC)

(Note) The "Population Census" was used for numbers of construction industry employees (statistical figures up to 2010)

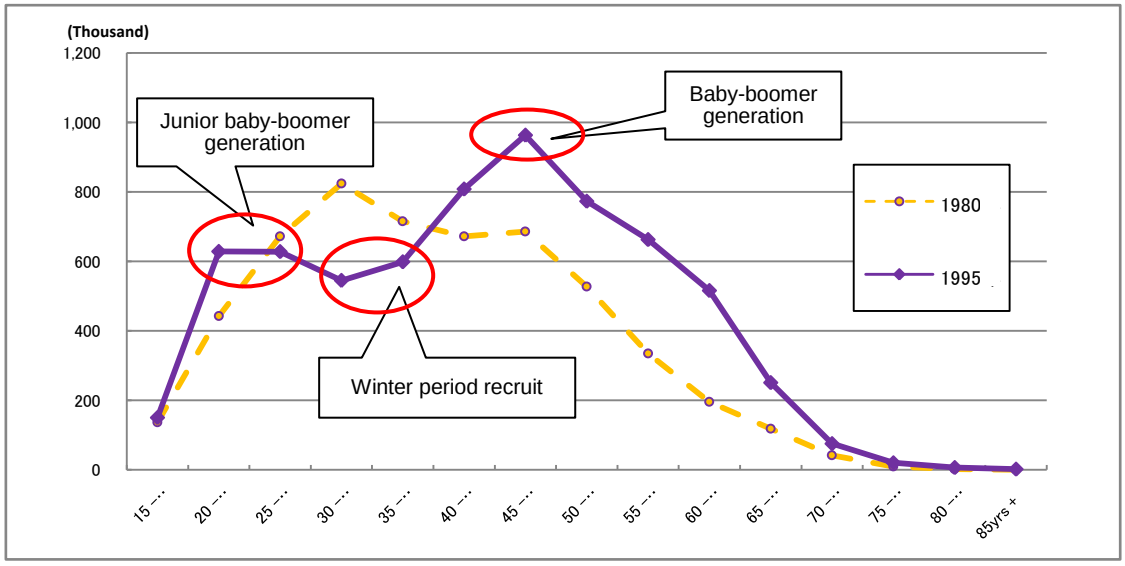
(2) Age Composition of Construction Industry Employees

① Changes between 1980 – 1995

By comparing that population census results between 1980 and 1995, we analyzed the shift in age composition of construction industry employees divided by five-year cohorts (by worker age group). The total number of construction industry employees was 5.38 million in 1980. Then the number increased significantly to 6.63 million in 1995. These changes correspond to the changes in construction investment (see Figure 1).

Figure 2 shows age composition of construction workforce in Japan. An "M" shaped curve can be seen in the cohort composition of 1995 in Figure 2. The peaks for the baby-boomer generation at the time (45-49yrs) and the junior baby-boomer generation (20-29yrs) are distinctly higher, while a trough can be seen for the generation who entered construction industry around 1980. During this period, fiscal austerity and economic recession in the wake of the second oil shock brought stagnant construction investment. This period is called as the "Winter Period of the Construction Industry" in Japan, and the industry trimmed recruits significantly. This is the main factor for shaping the "M" curve of the age composition.

Figure 2 – Age Composition of Construction Industry Employees 1980 - 1995

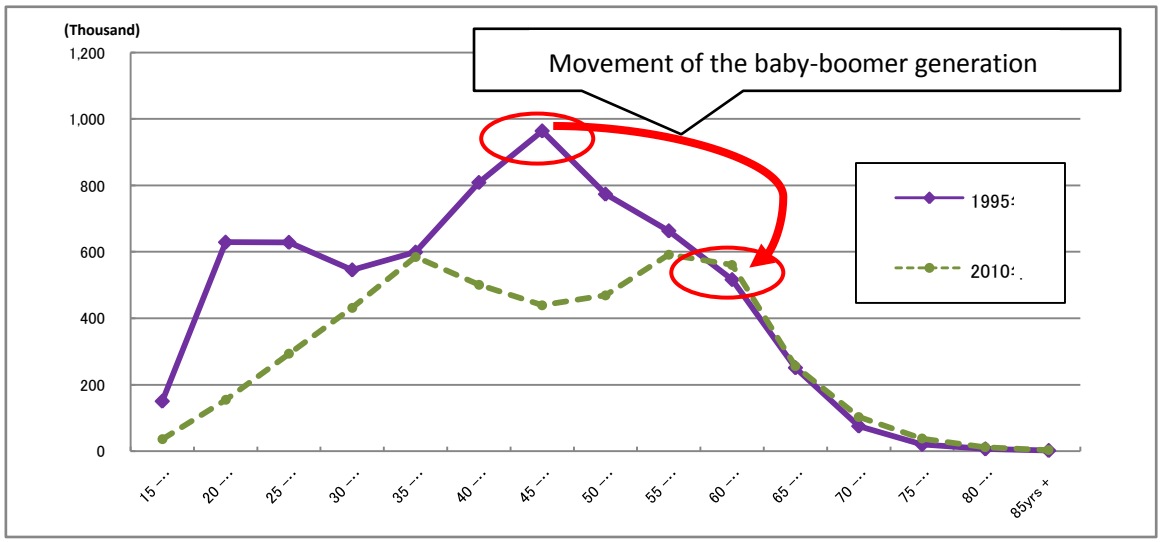


(Source) Created by RICE, based on the "Population Census" (MIC)

② Changes between 1995 – 2010

As seen in Figure 3, from 1995 onwards the "M" shaped curve shifted downwards as well as moved horizontally. This signifies the decrease in labor force for each cohort group during the period. Compared to the peak year of 1995, construction industry employees decreased significantly from 6.63 million to 4.47 million (△32.5%) by 2010. Construction investment in this period consistently decreased and resulted in the decrease in the total number of construction workers. In addition, the baby-boomer generation which formed the peak of the age composition reached 60yrs of age by 2010. As a result of their retirement, the peak flattened significantly in 2010 although this generation still occupies dominant share.

Figure 3 - Age Composition of Construction Industry Employees 1995 - 2010



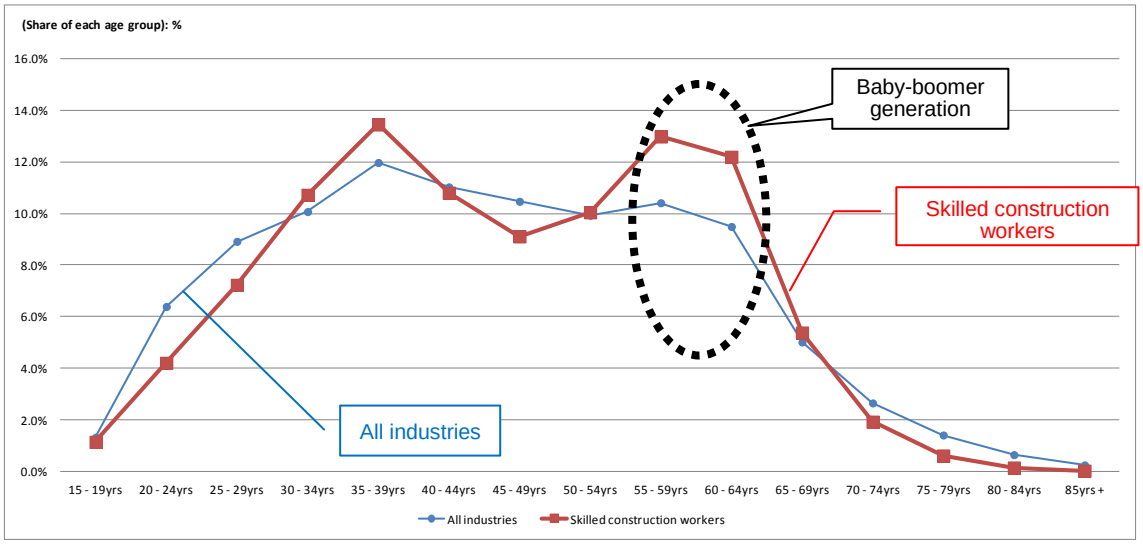
(Source) Created by RICE based on the "Population Census" (MIC)

(3) Rapid Aging of Construction Industry Employees and Decline in Youth Recruits

Figure 4 shows the age composition of the total employees in Japan and that of skilled construction workers in 2010.

The skilled construction worker graph shows a clear "M" shaped curve, and the peak for the baby-boomer generation (55-64yrs) is distinctly higher in comparison to that of the overall industries. It is clear that the baby-boomer generation still forms the mainstay of the construction industry workforce. However, they have already reached their 60yrs and eventually retire over the next few years, thus there are concerns that the shrinkage of construction workforce will accelerate in the coming years.

Figure 4 – Age Composition of Total Employees and Skilled Construction Workers (2010)

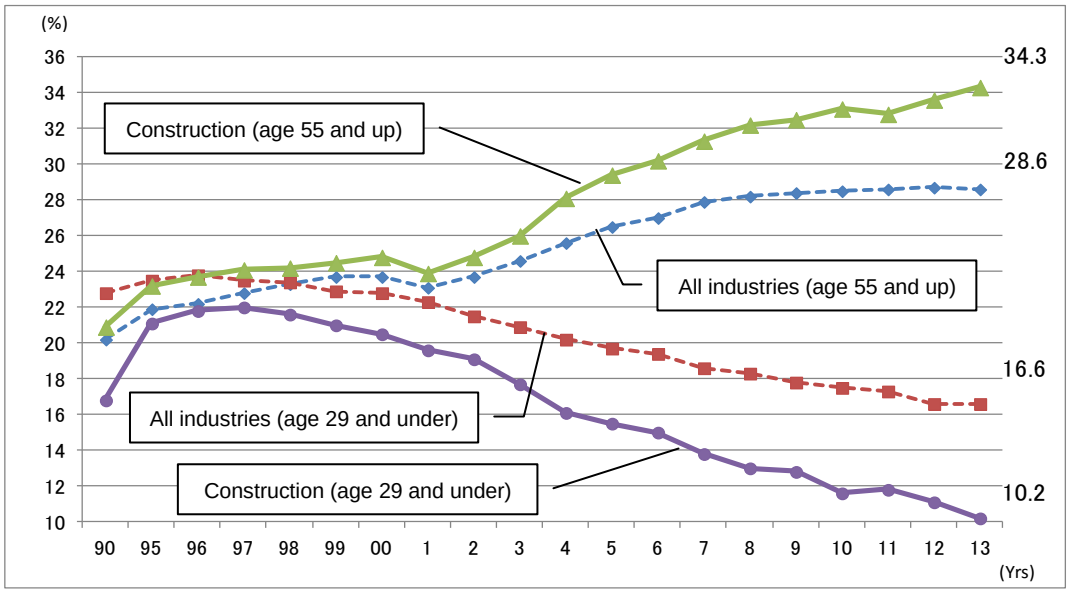


(Source) Created by RICE, based on the "Population Census" (MIC)

Figure 5 shows the trend of ratios for youth employees and senior employees in the past 20 years. In 2013, the share of employees 55yrs and over for all industries is 28.6%, while that of the construction industry is 34.3%, showing the construction industry depends more on senior workforce.

When looking at the percentages of employees 29yrs and under as of 2013, the figure for all industries is 16.6% while that of the construction industry is 10.2%. The gap becomes larger as year goes by, indicating that the decrease in youth workers is particularly pronounced in the construction industry.

Figure 5 – Ratios of Workers Aged 29yrs and under/55yrs and over

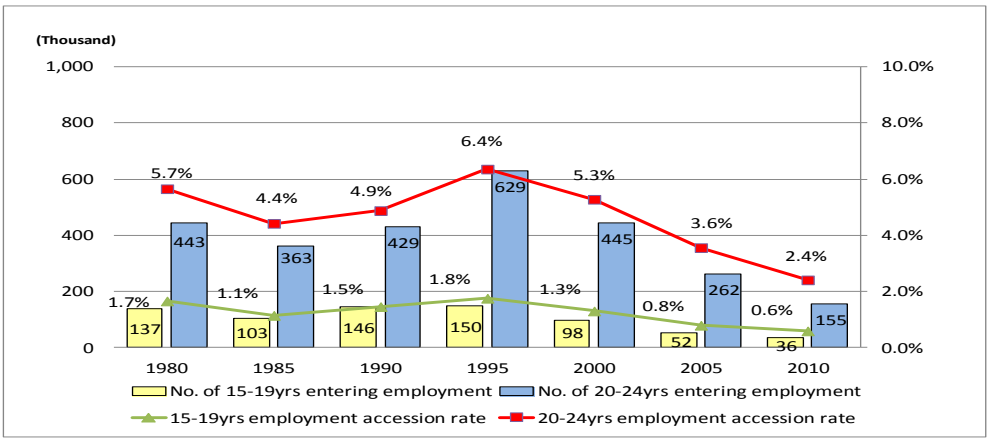


(Source) "Labor Force Survey" (MIC)

In recent years, construction industry is faced with sharp decline in youth recruits. Figure 6 shows recruits accession rate for construction sector (Number of youth population entered the construction industry ÷ Total population of the same age cohort).

The figure shows that accession rate has significantly declined since its peak of 1995. In 1995, 6.4% of the 20-24yrs population entered construction industry, but in 2010 only 2.4% of the youth did, a decline of almost 60%. The demographic structures of Japan shows an overall reduction in the youth population due to low birthrate and aging population[3]. Combined with this, the construction industry will be faced with further decline in youth employment, unless this trend is reversed.

Figure 6 – Number of Youth Employment and Accession Rate



(Source) Created by RICE, based on the "Population Census" (MIC)

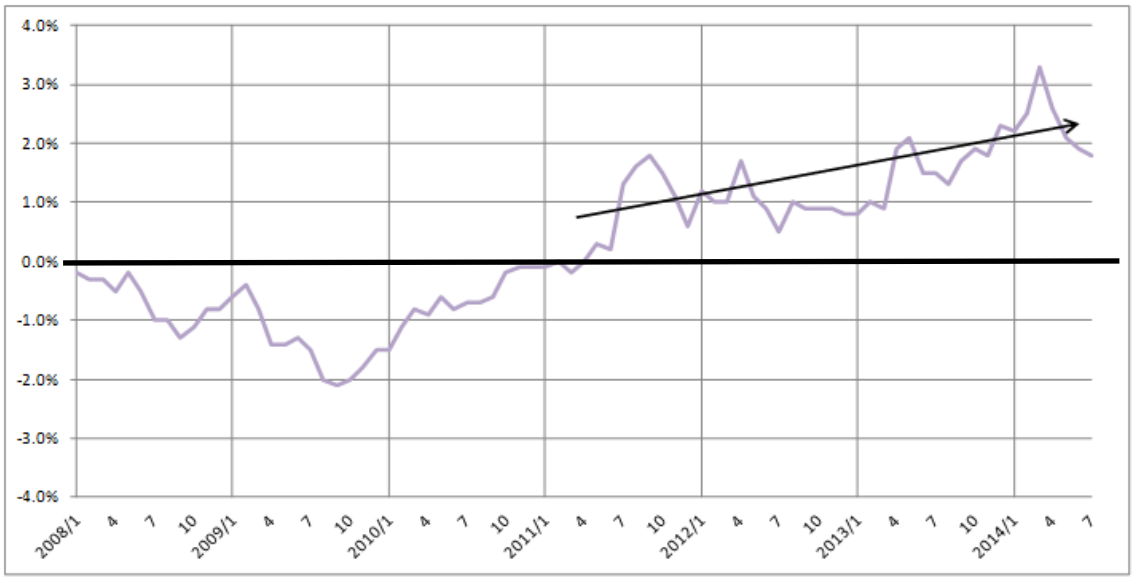
(4) Skilled Construction Worker Shortage

As previously mentioned, since its peak in 1992, construction investment in Japan fell to about half by 2010. During this period, skilled worker employed in the construction industry decreased significantly. However, after the Great East Japan Earthquake, construction investment was on recovery trend and in recent years it reached around ¥50trillion, 20% increase from FY2010. This market expansion resulted in workforce gap in the industry, and the shortage of skilled construction workers has become a serious issue.

Figure 7 shows the shortage rate of skilled construction workers from 2008 up to the present day. There is a watershed in spring 2011. Before that the survey shows surplus in labour market of the construction industry, but just after the Great East Japan Earthquake in March 2011, the trend turned upward (which means labour shortage), and since then the shortage of skilled construction workers is intensified.

[3] According to the "Population Census", youth population (15-24yrs) was 9.43 million in 1995. This figure had decreased to 6.38 million by 2010 (Δ32.3%).

Figure 7 – Shortage Ratio of Skilled Construction Workers



(Source) Created by RICE, based on the "Construction Labor Supply and Demand Survey (8 Job Types)" (MLIT)

3 RICE Projections of Construction Industry Employees

Construction industry employees in Japan are getting older every year, and in the near future, after the complete retirement of baby-boomer generation, the industry may suffer more serious skilled worker shrinkage.

This chapter shows the outline of our projection on construction industry employees based on cohort analysis method.

(1) Cohort Analysis Method

In simple terms, a cohort analysis is used in a projection, by assuming the rate of change of population cohorts during certain two periods continue in future. Figure 8 shows an example of the cohort analysis. First, we calculate a change ratio of a certain cohort. For example, the 645 thousand employees aged 30-34yrs in 2005 shifted to 35-39yrs cohort group by 2010, while the number of employees decreased to 585 thousand, thus we get the rate of change as ∆9.3%. We assume subsequent cohorts will decrease at the same ratio when they reach the same age stage. Based on the assumption, we aggregate the result of each age cohort and get the projection results.

Figure 8 – Cohort Analysis Example

	15 - 19yrs	20 - 24yrs	25 - 29yrs	30 - 34yrs	35 - 39yrs	40 - 44yrs
2005	52	262	468	645	565	501
2010	36	155	293	432	585	501

(2) Results of Projection

①Overview of the Projection

Figure 9 shows the aggregated results of estimates on construction industry employees, based on the assumption that rates of change from 2005 – 2010 will continue into the future. The results of estimates show that the 5,392 thousand workers in 2005 will decrease to 2,405 thousand by 2025 (△55.4% from 2005), a shocking result indicating a decrease by half.

Figure 9 – Results of Projection using 2005-2010 Rates of Change

Year	2005	2010	2015	2020	2025
No. of construction industry employees (1,000)	5,392	4,475	3,639	2,945	2,405
Rate of decrease (2005 comparison)	–	△17.0%	△32.5%	△45.4%	△55.4%

(Note 1) Figures for 2005 and 2010 are actual figures from the population census. Figures in the grey columns are estimates from the projection.

②Correction of Scenarios

The above-mentioned projection was calibrated on the cohort charge rate of 2005-2010 periods, which is influenced by serious economic downtown. The 2005-2010 period experienced large cuts in investment affected by the overall economic pullback of the “Lehman shock”, and this peculiar background is considered to be a major causal factor from the big decline in the 2005–2010 (△17.0%).

However, after the bottom of 2010, private and public investment made a significant recovery (Figure 1). In addition, a variety of measures were hammered out by the MLIT, the Ministry of Health Labour and Welfare, and also the construction industry showed concerted efforts to improve worker conditions and recruits promotion. Also, with the decision for Tokyo to host the 2020 Summer Olympics and Paralympics, a long-term perspective is now positive for the construction industry.

In view of these circumstances, work force projection based on the rate of change for the 2005-2010 periods should be revised. As shown in Figure 10, other scenarios are presented, with some positive corrections to the rates of change.

Figure 10 – Positive Corrections and Revised Scenarios

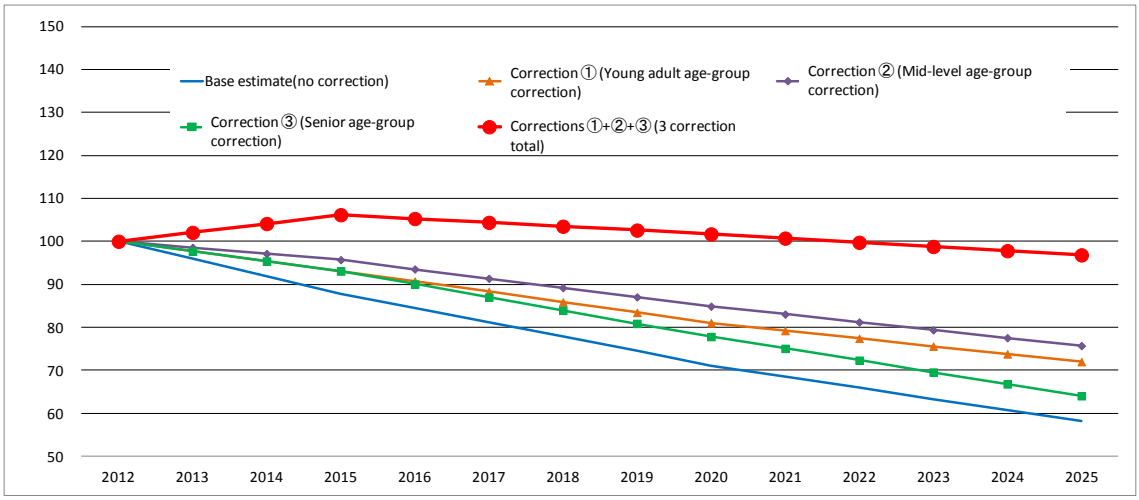
①Young adult age group correction	Recovery of youth accession (15-24yrs)rate to year 2000 levels.
②Mid-level age group remain in the sector	Reduction of mid-level age group employees (25-59yrs) stops, and they will remain in the industry.
③Senior age group postpone retirement	Senior workers (60-69yrs) postpone retirement, resulting in a 50% reduction in the number of retirees during this age period .
Correction ①+②+③	Total of all assumed corrections for ① - ③

(3) Result of Corrected Projections

In Figure 11, revised projection results of construction industry employees are presented, as the Index values of base year 2012[4]. In comparison to the base estimate (no correction) which assumes a continued rate of decrease equivalent to that of 2005-2010, the corrected projections shift upward in the order of ,

③senior age-group <①young age-group < ②mid-level age-group < total of three corrections.

Figure 11 – Employee Projections on Different Scenarios (2012=100)



[4] The number of construction industry employees for 2012 was calculated through equal interval interpolation between the figure of 4.47 million given in the 2010 population census and the figure of 3.64 million calculated under future estimates for 2015.

Figure 12 shows the projection in 2025 and comparison with base year of 2012. The results show that even when all three corrections are achieved (optimistic correction), the total employees will still be smaller by 131 thousand (△3.2%) in comparison to 2012 levels, indicating an unavoidable decrease in the number of employees.

Figure 12 – Projection Results on 2025 and Comparison with 2012

Year/Case	No. of construction industry employees (1,000)	2012 comparison (Change)	2012 comparison (Rate of change)
2012 (Base year)	4,140	―	―
2025 Base estimate (no corrections)	2,405	∆1,735	∆41.9%
2025 ① (Young adult age-group correction)	2,980	∆1,160	∆28.0%
2025 ② (Mid-level age-group correction)	3,135	∆1,005	∆24.3%
2025 ③ (Senior age-group correction)	2,652	∆1,488	∆35.9%
2025 ①+②+③ (3 correction total)	4,009	∆131	∆3.2%

(Note) In principle, calculated figures are rounded off, so fractional values will not match totals.

We interpreted the projection results as follows;

"Projections show a decrease in the number of employees even when such optimistic positive corrections are made, implying that the manpower shortage in the construction industry is a long-term structural issue and not a temporary phenomenon[5]".

The projections above mentioned highlighted the urgent need for the industry to take actions for securing and nurturing human resources in order that the industry becomes sustainable in the future.

4 Recent Movements to Secure Human Resources

(1) Construction Industry Revitalization Conference

In January 2014, Construction Industry Revitalization Conference was established from the members of the two government ministries (Ministry of Land, Infrastructure, Transport and Tourism. Ministry of Health Labour and Welfare), industry organizations, educational institutes and research institutes, where the chairman of RICE participated as a conference member. The aim of the conference was to address important labour issues including the enhancement of working

[5] For example, the assumption that youth accession rates will suddenly recover more than double to the level in 2000 is optimistic enough (2010 rate 2.4% → 2000 rate 5.3%).

conditions, and undertook a series of discussions on short-term and medium/long-term policy measures.

In June 2014, an Interim Report was published after six months of intensive discussions. The Interim Report set forth about 80 specific measures to secure and nurture workers for the construction industry. These are the main points of their recommendations;

① Improvements in the working conditions of skilled workers
② Pride (promotion of young adults)
③ Working environment that offers a view of future prospects
④ Enhanced vocational education and training
⑤ Greater involvement of women workers
⑥ Labor-saving innovations and sophistication of construction production systems.

(2) Policy Measures for Securing Human Resources

① Improvements in Skilled Workers' Benefits

A. Increase in workers payment for public works

- Significant improvements in standard skilled worker wages for public works in April 2013, for the first time in 16 years, followed by additional rise in February 2014.
  April 2013: +15.1%
  February 2014: +7.1%
- Request from the MLIT to major construction industry organizations for paying proper levels of wages and allowances toward skilled workers.
- Utilization and promotion of "sliding price clauses" to accommodate prompt rises in labor costs after contracts are entered.

B. Enrollment in social insurance and other social benefits

- Necessary statutory social welfare costs were reflected into wages of the contractors for public works.
- From September 2013, submission of estimate sheets from sub-contractors to prime contractors was formalized, showing clear breakdowns of statutory welfare expenses based on the standardized cost estimate sheets of each special sub-contractors organization.
- From August 2014, the MLIT required prime contractors of public works to limit sub-contract orders toward companies with enrollment records of social insurance.

② Women Workers Participation

- In order to promote labour participation of women across the board, Japanese Cabinet adopted overall initiatives for "Promoting Active Participation by Women" in June 2013, under the "Japan Revitalization Strategy."
- In August 2014, the MLIT and five major construction industry organizations drafted the

"**Action Plan to Promote Greater Active Participation of Women in the Construction Industry**", and announced their plan to double the number of women engineers and skilled workers within five years.

These are the main points of the action plan for woman workers participation in the construction industry.

- Welcoming further active participation of women throughout the construction industry.
- Setting of numerical targets by the construction industry and companies and drafting of behavioral guidelines, etc.
- Statement of construction industry appeal and fulfilment through collaboration in the classrooms (Elementary, junior high, high schools and universities, etc).
- Preparation of women friendly working environments, such as separate lavatories and locker rooms, etc.
- Preparation of women friendly working environments in terms of working systems such as reduction of long working hours, taking planned leave, etc.
- Active introduction/utilization of systems that allow work and family life to stand together.
- Presentation of model construction works in which women workers can take an active role, creation and dissemination of information on good practices of construction sites, promotion of construction teams with women in leading roles.
- Implementation of vocational training in which women can easily participate, and rewards for active women workers.
- Dissemination of information through a specific portal site.
- Support for the activities of local networks that support the active participation of women.

③ Utilization of Overseas Human Resources

- The "Emergency Measures Related to the Utilization of Overseas Human Resources in the Field of Construction" was approved by the Cabinet in April 2014. As an emergency and time-limited measure for the temporary increase in construction demand related to the 2020 Tokyo Olympic and Paralympic Games, the utilization of industry-ready overseas human resources is being promoted.
- Extension of stay period from 3 years to 5 years (temporarily up to 2020).
- Past trainees who have completed training programs in Japan may re-enter Japan for construction works under employment contracts (temporarily up to 2020).

5 Technical Innovations and Productivity Improvement in the Project Delivery

Apart from the efforts to secure and nurture the next generation of technicians and skilled workers, the construction industry in Japan has undertaken a variety of approaches for technical innovation such as the adoption of TQC (Total Quality Control) and VE (Value Engineering), the development of new technologies and construction methods.

In this section, we will introduce some of the innovative technologies recently developed by Japan's construction companies in order to meet labour shortage issues.

(1)Material-Transportation Robots (Obayashi Corporation)

The Obayashi Corporation utilized material-transportation robots on the construction site of the skyscraper "Toranomon Hills", which recently opened in June 2014. This was the first attempt in the Japanese construction industry to use robots on actual construction sites. The use of the robot allowed Obayashi to reduce the number of personnel needed for material transportation half, from four to two persons pen item. Obayashi state that they could reduce the cost of on-site transportation works about 30% compared to conventional ones.

Obayashi is planning to expand the use of the material-transportation robots on other construction sites such as factories and commercial building, and are planning to apply this innovative delivery method at 10-20 sites a year.

Figure 13 – Material-Transportation Robot

(Source) Obayashi Corporation

(2)Un-manned construction system (Taisei Corporation)

In July 2014, Taisei Corporation conducted verification tests on their next-generation un-manned construction system, in which the machinery itself makes judgments and proceeds with work accordingly. In this test, an "autonomous method" was applied in which heavy machinery equipped with sensors make judgments of the site condition automatically and process necessary jobs. This system does not require constant remote operation or any supporting machinery.

In the verification test, an 11-ton vibrating roller was used. Parameters were entered into a PC such as the range of compaction, the number of compaction times and overlap width, and the roller machine entered into operations accordingly, The heavy machinery commenced roller-compaction work under this "autonomous method", while using its own sensors to maintain an awareness of position, attitude, speed and surrounding conditions, etc. Afterwards, the machinery returned to a pre-designated location, sent work completion notification to the operator and then switched itself off. Taisei announced that the effective functioning of this new technology had been confirmed.

Based on this verification test, Taisei aims to apply this technology to severe construction sites such as earthquake recovery/reconstruction sites, and other sites as well through the further enhancement of the technology.

Figure 14 – Verification Tests of un-manned Machinery

(Source) Taisei Corporation website

6 Conclusions

Construction industry in Japan has endured decreasing investment demand for almost two decades, and intensifying competition with deterioration in workers' condition, aging of employees and sharp decline in the youth enrollment. If this trend continues, structural deterioration of the construction industry is inevitable.

In the "projection of construction industry employees" implemented by RICE, striking shrinkage of workforce was forecast by 2025, even when some optimistic corrections were added. It is feared that further shrinkage of the construction workforce might cause inadequate maintenance of regional infrastructure, poor disaster response and so on. Revitalization of the construction industry by securing and nurturing a future workforce is therefore the most important issue.

In January 2014, the "Construction Industry Revitalization Conference" was established, and a unified public-private approach was discussed to save the construction industry. In June 2014, an Interim Report set out a series of policy measures to secure and nurture workers, such as enhanced treatment of skilled workers, enrollment of skilled women workers, implementation of more efficient production systems, and the enhancement of vocational training facilities.

Recent media news frequently talk on "manpower shortages" in a variety of industries such as service industries, retail sectors and elderly care sector, apart from the construction industry. When looking at the demographic movement in Japan, further shrinkage of labour force is unavoidable, and even more intense competition to secure human resources is expected among various sectors.

Construction industry is still influenced by the trauma of recent economic downturn, and top managers still express their concerns that they "cannot invest in human resources, because after the reconstruction works from the Great East Japan Earthquake and the special demand generated by the 2020 Tokyo Olympic and Paralympics Games, it is likely that there will once again be a surplus of construction industry employees." The RICE projection shows that the labour force shrinkage of construction sector is demographically structural, and it is highly likely that skilled worker shortage will be worse if no serious actions are taken. Steady efforts to secure and nurture human resources are urgently needed .

Recent efforts by the construction industry and governments to secure workers for the medium and long term through a unified public-private approach will be rewarded in the future. We strongly hope that the construction industry will restore respect among the youth, and regain its strength.

Construction Industry Moving to Secure Human Resources —Recent Policy Initiatives

JAPAN 

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Research Institute of Construction and Economy

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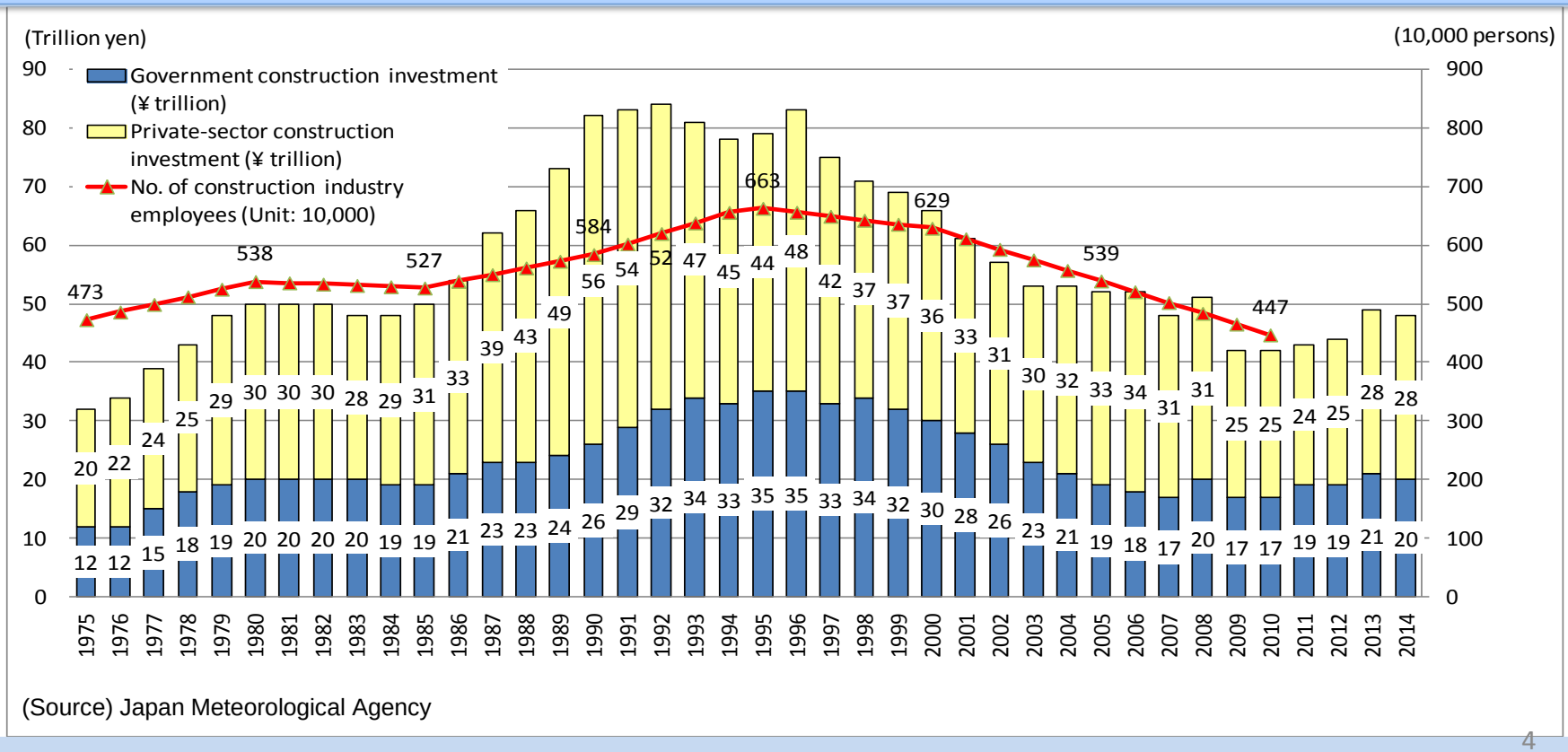
1. Trends in the Construction Industry and Employment

1 - 1 Trends in Construction Investment and Employment

Construction employment

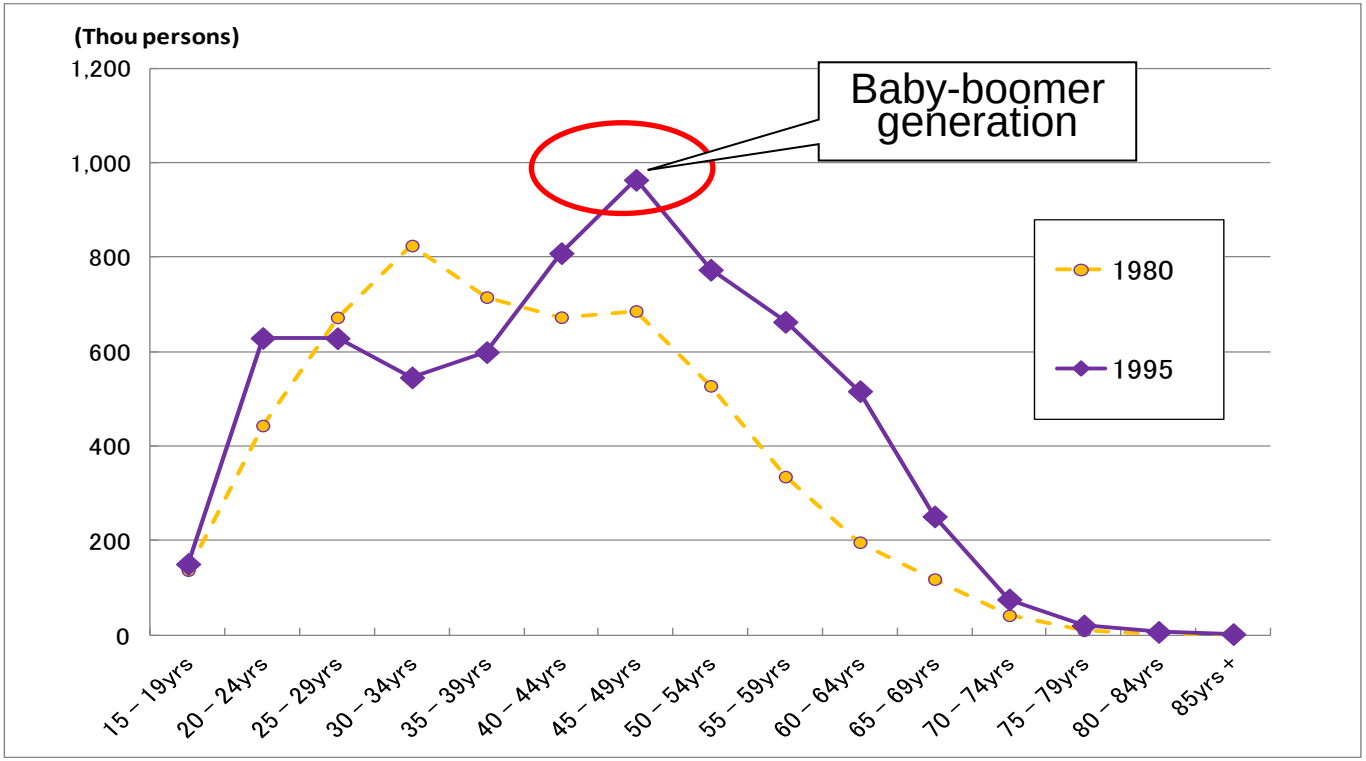
6.6million(1995)⇒4.5million(2010) △32.6%



1 - 2 Age Composition of Construction Industry Employees (1980 – 1995)

1980—1995

- Aging of total employment in construction industry.
- Two peaks of age cohorts：baby-boomers and juniors.

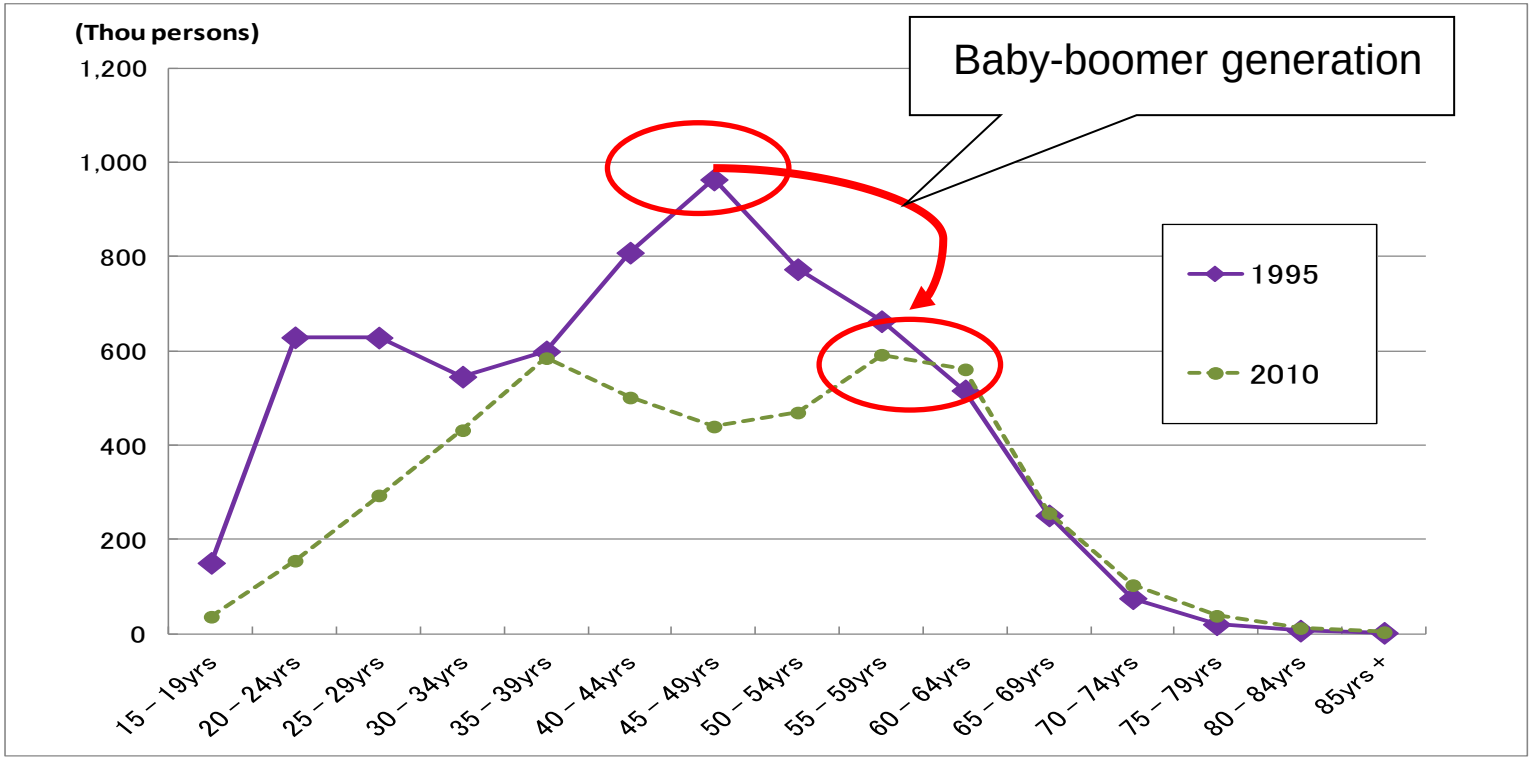


1 - 3 Age Composition of Construction Industry Employees (1995 – 2010)

1995—2010

- Retirement of baby-boomers
- Low accession of young workers

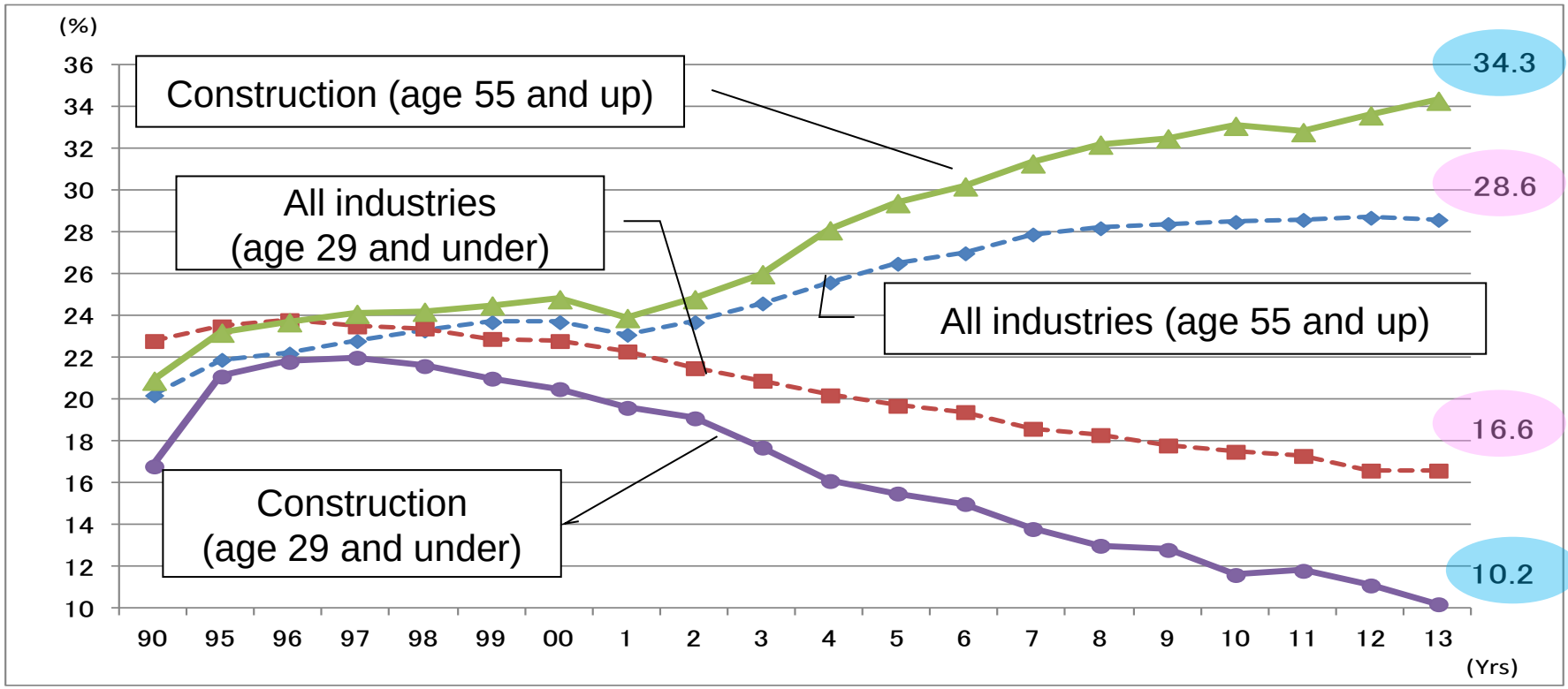
→ workforce shrinkage



1 - 4 Ratios of Workers Aged 29yrs and under/55yrs and over

- Rapid aging : 34.3% are 55⁺yrs
- Fewer youth : 10.2% are 29⁻yrs

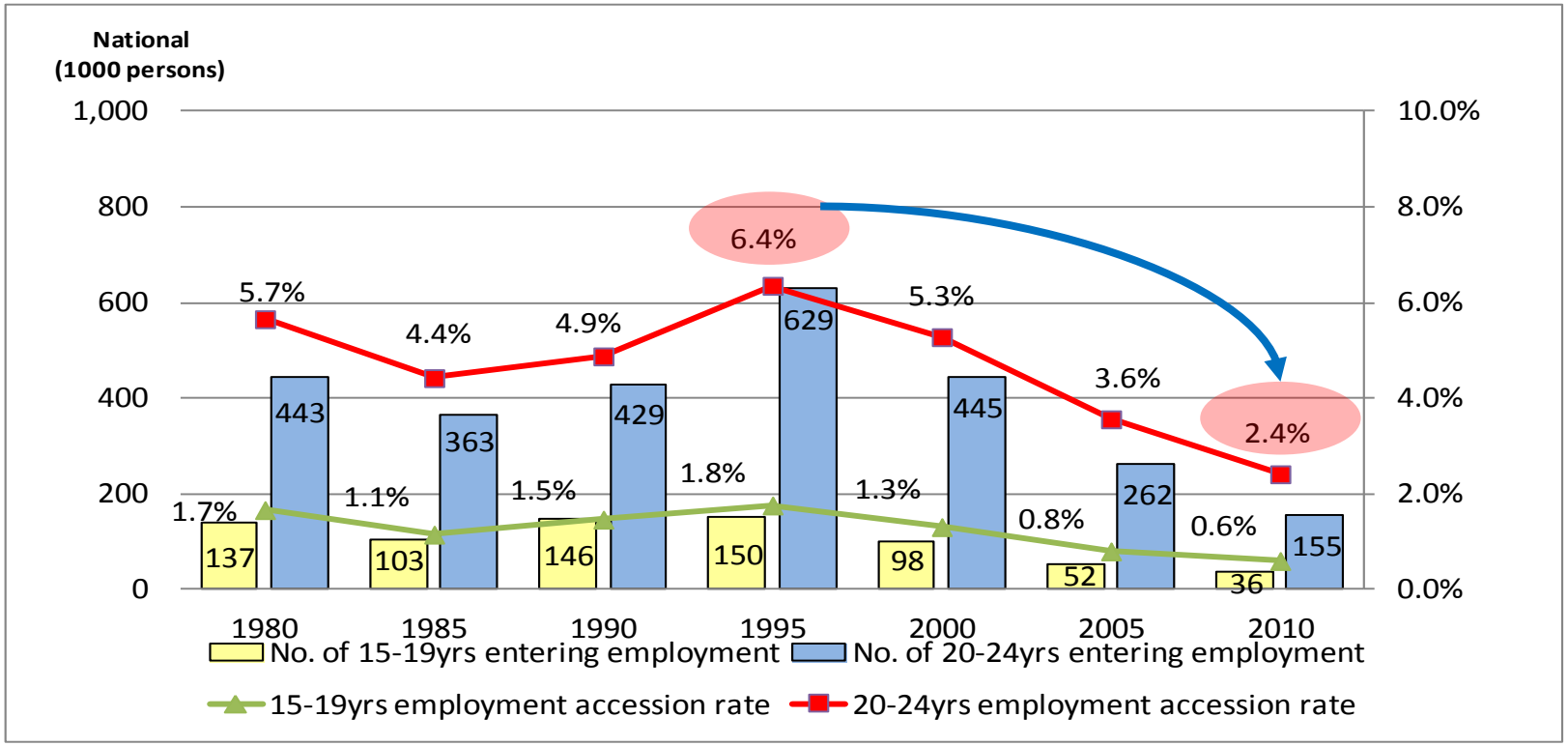
(2013)



1 - 5 Number of Youth Employment and Accession Rate

Failure to attract younger generation

accession rate (20～24yrs) : 6.4%（1995）⇒2.4%（2010）

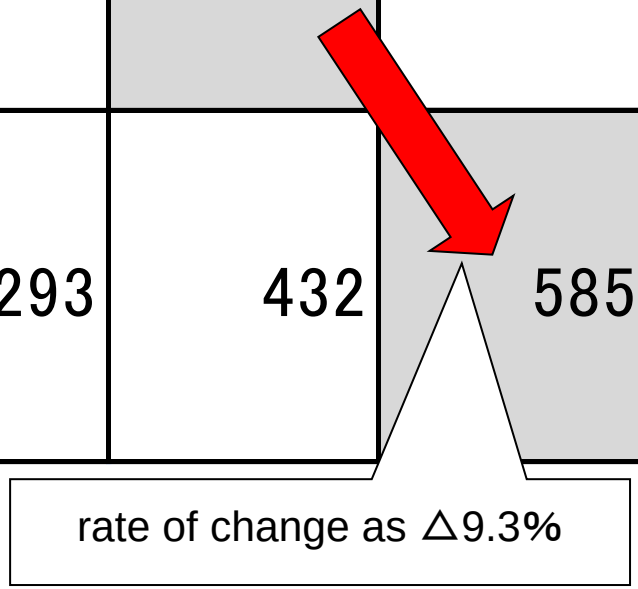


2. RICE Projections of Construction Industry Employees

2 - 1 Cohort Analysis Method

(Thousand)

FY	15 – 19yrs	20 – 24yrs	25 – 29yrs	30 – 34yrs	35 – 39yrs	40 – 44yrs
2005	52	262	468	645	565	501
2010	36	155	293	432	585	501



2 - 2 Results of the Baseline Projection

(Projection)

(Thousand)

Year	2005	2010	2015	2020	2025
No. of construction industry employees (1,000)	5,392	4,475	3,639	2,945	2,405
Rate of decrease (2005 comparison)	−	△17.0%	△32.5%	△45.4%	△55.4%

2 - 3 Corrections to the Baseline Scenario

Reasons for Correction

- 2005-2010 : “Lehman shock” period.
  Construction investment plunged⇒**sharp decline in employees(△17.0%）**
- 2010－　　: Recovery of investment
  ＋ Positive prospect for 2020 Tokyo Olympic

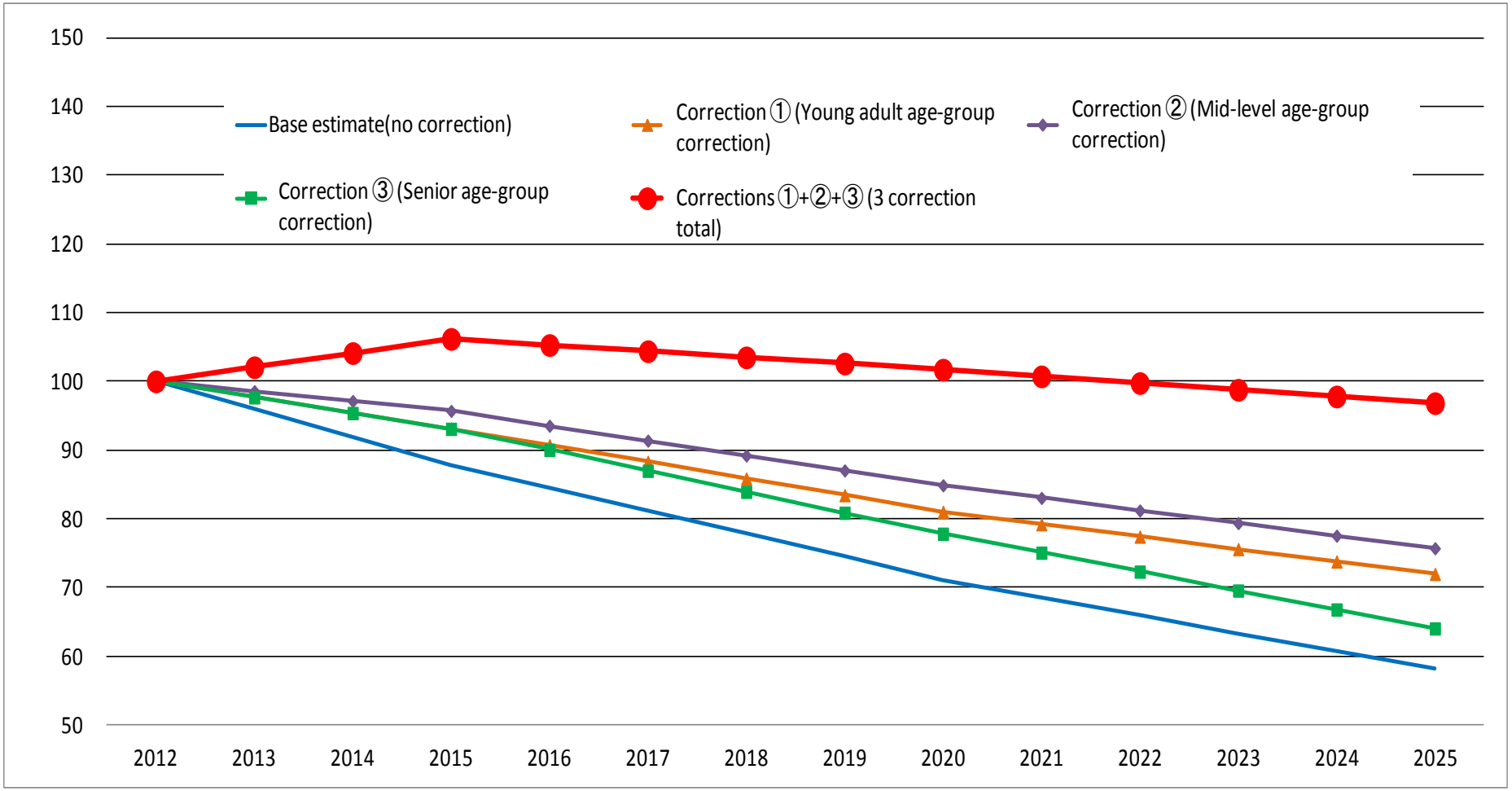
Positive Corrections to Parameters

- Youth Accession Rate
- Job Retention Rate
- Retirement Age

2 - 4 Positive Corrections and Revised Scenarios

	Corrections for rate of change
①Youth Accession Rate	Recovery of youth accession(15-24yrs)rate to year 2000 levels.
②Job Retention Rate	Mid-level age group employees(25-59yrs) will remain in the industry during their carrier.
③Retirement Age	Seniors (60-69yrs) postpone retirement, resulting in a 50% reduction in the number of retirees during this age period.
Correction ①+②+③	Total of all assumed corrections for ① - ③

2 - 5 Employee Projections on Different Scenarios (2012=100)



2 - 6 Projection Results on 2025 and Comparison with 2012

Year/Case	No. of construction industry employees (1,000)	2012 comparison (1,000)	2012 comparison (Rate of change)
2012 (Base year)	4,140	－	－
2025 Base estimate (no corrections)	2,405	△1,735	△41.9%
2025 ① (Young adult age-group correction)	2,980	△1,160	△28.0%
2025 ② (Mid-level age-group correction)	3,135	△1,005	△24.3%
2025 ③ (Senior age-group correction)	2,652	△1,488	△35.9%
2025 ①+②+③ (3 correction total)	4,009	△131	△3.2%

3. Recent Movements to Secure Human Resources

3 - 1 Construction Industry Revitalization Conference

Construction Industry Revitalization Conference

Policy Recommendations(2014.6)

①Improvements in the working conditions of skilled workers.
②Pride (promotion of young adults).
③Working environment that offers a view of future prospects.
④Enhanced vocational education and training.
⑤Greater involvement of women workers.
⑥Labor-saving innovations and sophistication of construction production systems.

3 - 2 Policy Measures for Securing Human Resources

① Improvements in Skilled Workers' Benefits

- Increase in workers payment for public works.(Feb 2014)
- Enrollment in social insurance and other social benefits.(Aug 2014)

② Women Workers Participation

- "Action Plan to Promote Greater Active Participation of Women in the Construction Industry".(Aug 2014)

③ Utilization of Overseas Human Resources

- "Emergency Measures Related to the Utilization of Overseas Human Resources in the Field of Construction" approved by the Cabinet. (Apr 2014)

4. Labour Saving Innovations

4 - 1 Material-Transportation Robots (Obayashi Corporation)

4 - 2 Un-manned construction system (Taisei Corporation)

Conclusions

- Construction industry in Japan has endured decreasing investment demand for almost two decades, which resulted in deterioration in workers' condition, aging of employees and sharp decline in the youth enrollment. If this trend continues, structural deterioration of the construction industry is inevitable.

- In the "projection of construction industry employees" implemented by RICE, striking shrinkage of workforce was forecast by 2025, even when some optimistic corrections were added.

- Steady efforts to secure and nurture human resources are urgently needed and Japanese government and private sector are implementing holistic policy measures to tackle this problem.

Thank you for your attention !!