

Japan-DK-seminar, Copenhagen

September 13, 2019

Theme 1. Challenges and visions for construction

A New Stage of Construction in Japan i-Construction

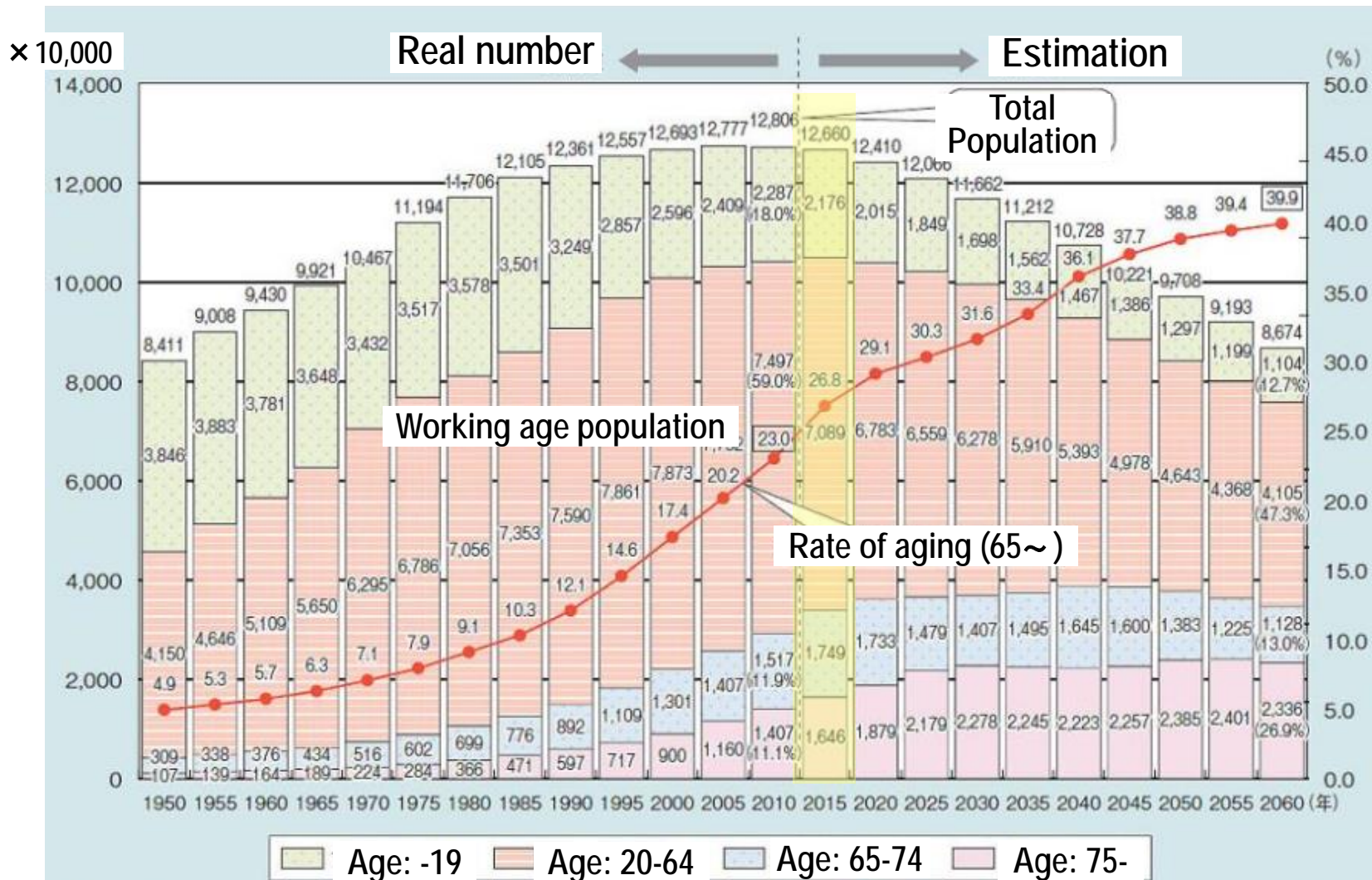


Ritsumeikan University

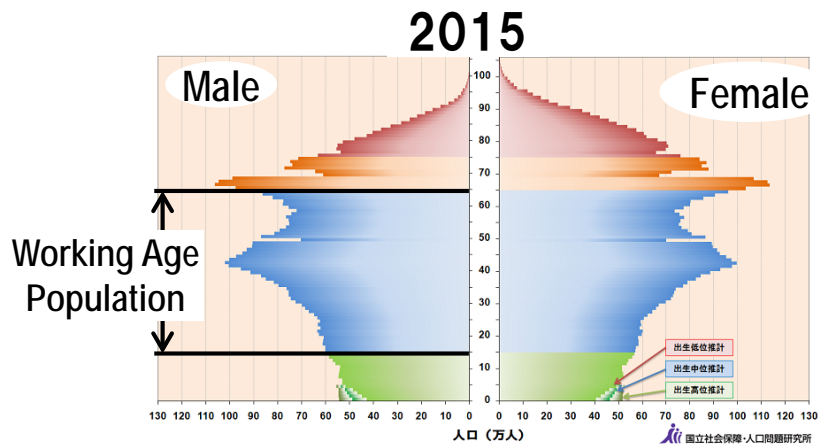
Kazuyoshi Tateyama

Background for Necessity of Innovation in Japanese construction

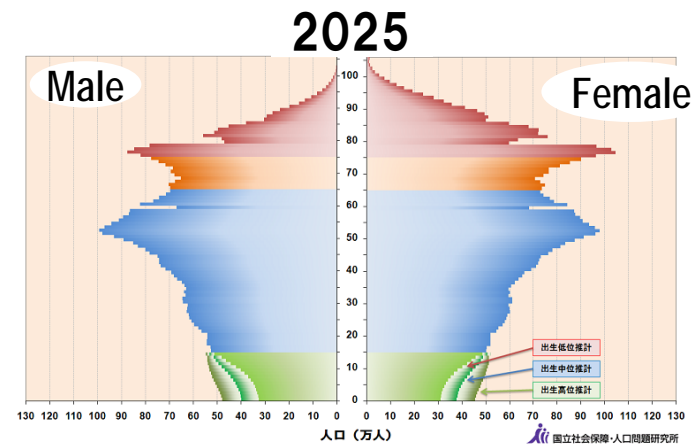
Population Movement and Prediction in Japan



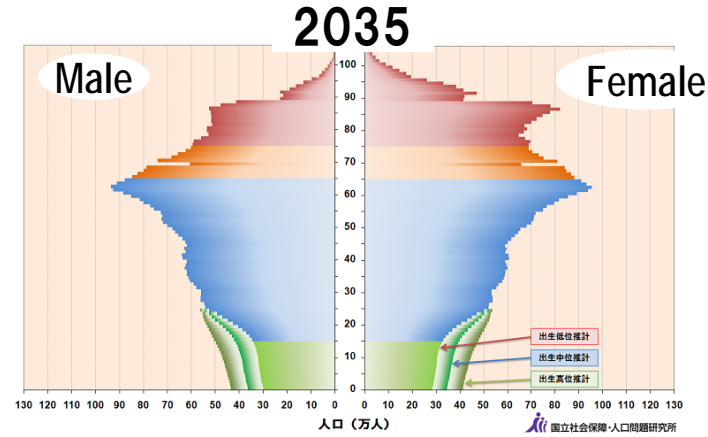
資料：2010年までは総務省「国勢調査」、2015年以降は国立社会保障・人口問題研究所「日本の将来推計人口（平成24年1月推計）」の出生中位・死亡中位假定による推計結果
 (注) 1950年～2010年の総数は年齢不詳を含む



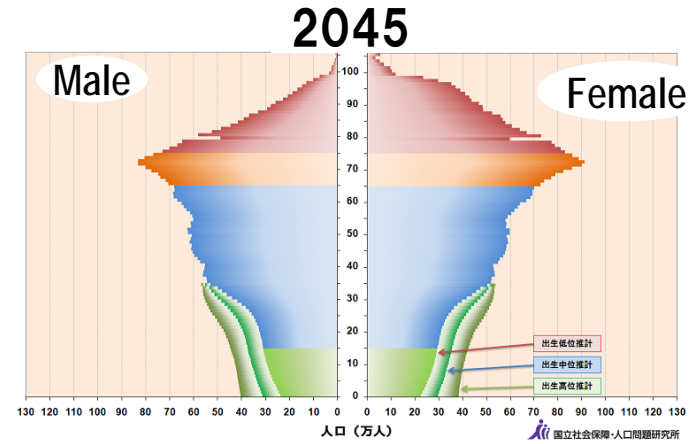
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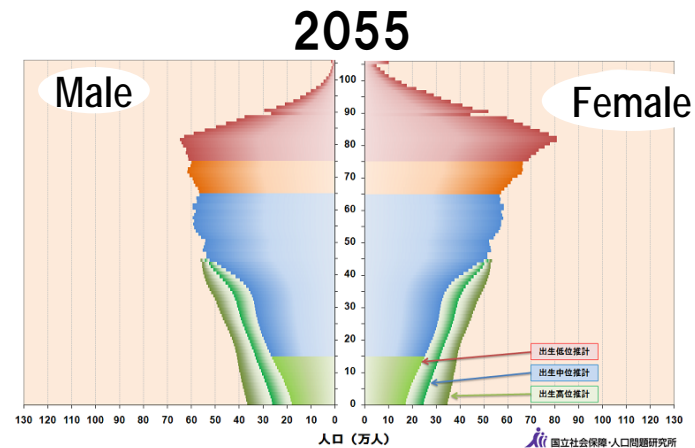
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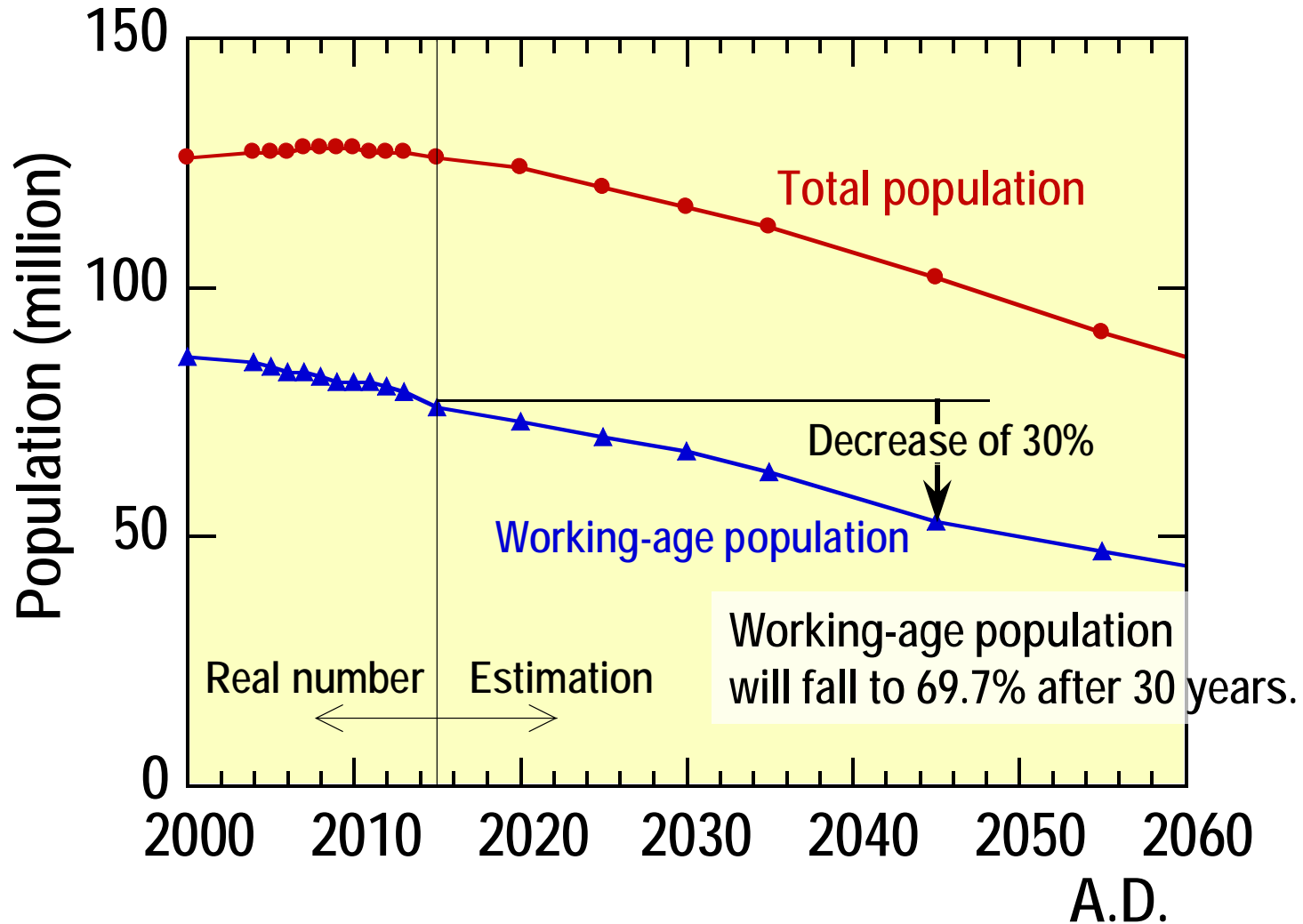
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Population Pyramid in Japan for 2015 - 2055

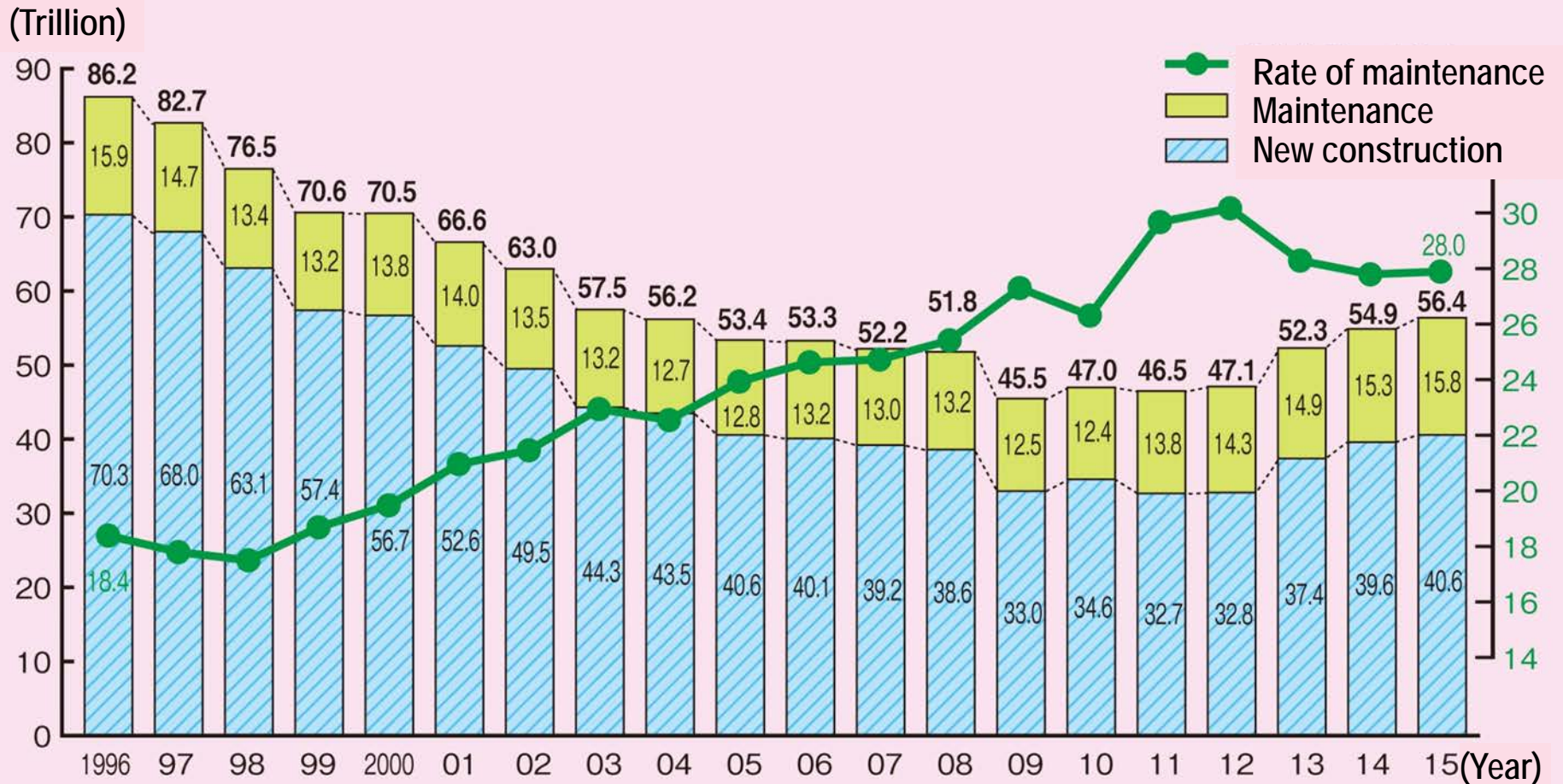
Population Prediction in Japan



- The decrease in the number of construction engineers and workers will accelerate.
- Reduction of the tax revenue → Shrinking of budgets for public investment.

From the point of view of maintenance and management

Change of Infrastructural Investment

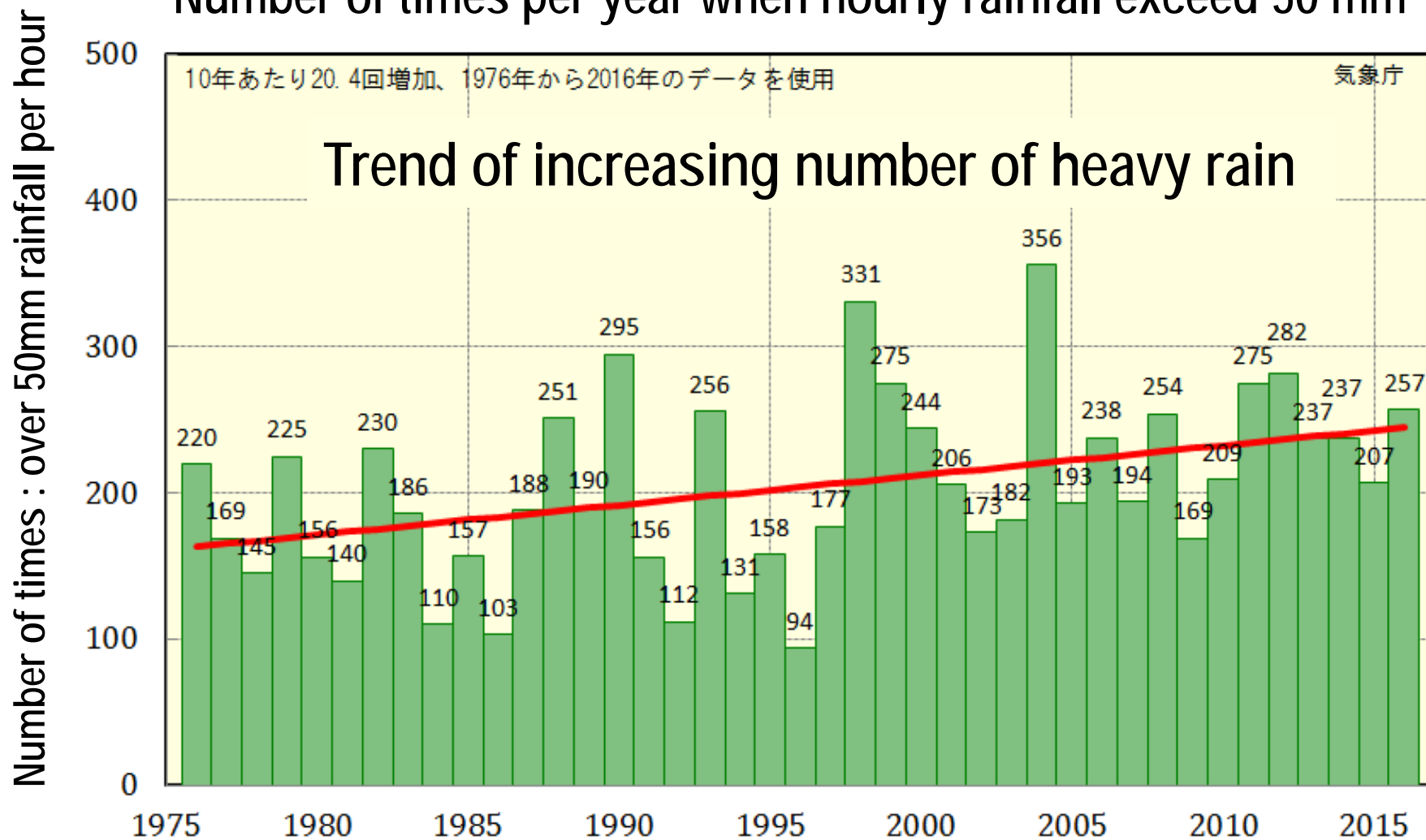


(From Japan Federation of Construction Contractors: Handbook for Construction Industry 2017)

Compared with the 1990s, although new construction reduces by half, repairs and renewals increase slightly.

From the Point of intensifying Natural Disaster

Number of times per year when hourly rainfall exceed 50 mm



(By Japan Meteorological Agency , Ministry of land, infrastructure and transport)

Natural disasters has been intensifying in Japan.

Reasons that Japanese construction should change

Decrease of working age population will bring

- Lack of engineers, workers in construction
- Reduction of the tax revenue → Shrinking of budgets for public investment.

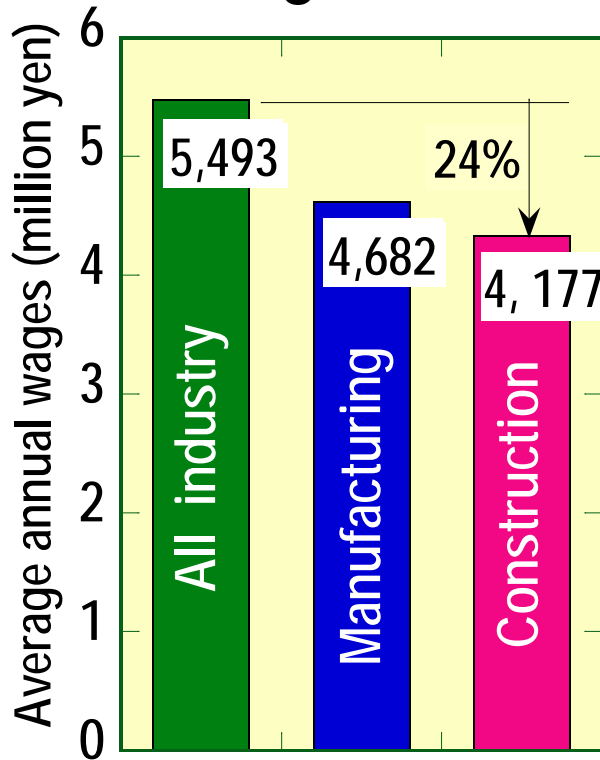
Increase of the complicated and difficult jobs for maintenance and disaster prevention



We cannot complete our social part of providing the infrastructures stably with some extending methods from the current ones.

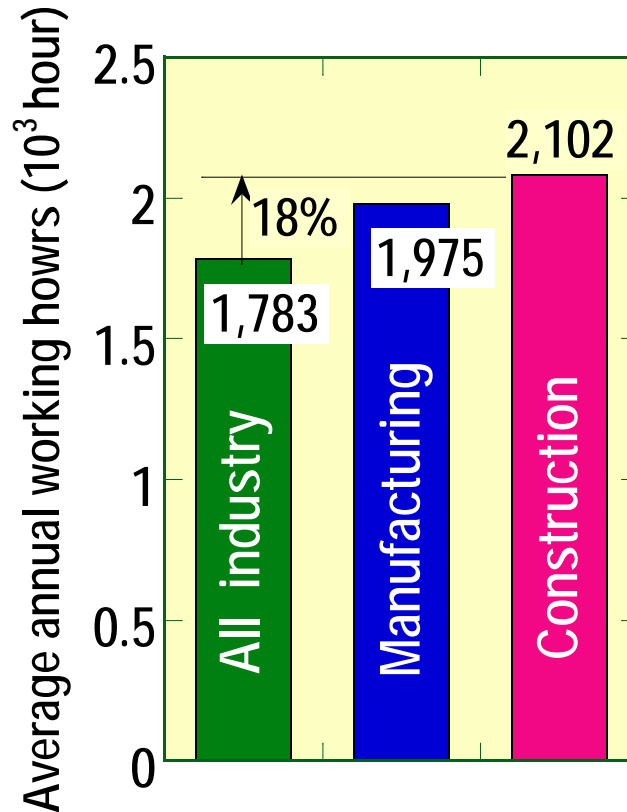
Industrial Potential of Japanese Construction

Wages level



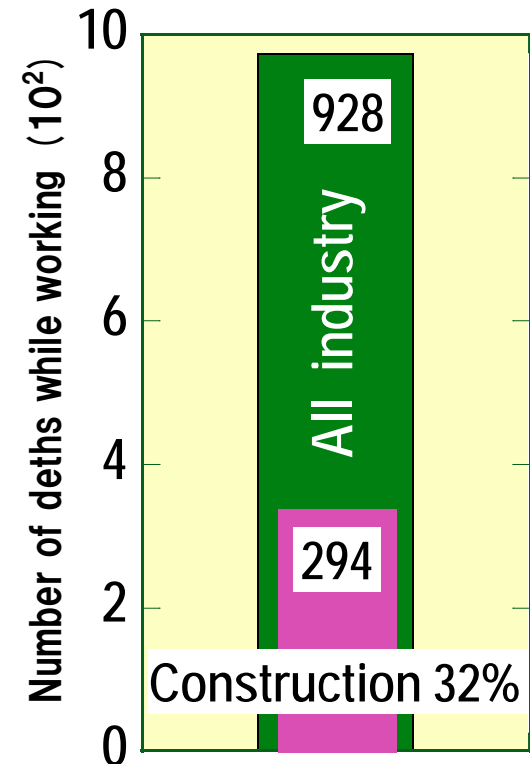
Lower wage level than other industries
(76% of the all-industry average)

Working hours



Longer working hours than other industries
(118% of all-industry average)

Deaths number



32% death number of all-industry

Comparison of Changes in Labor Productivity by Industry

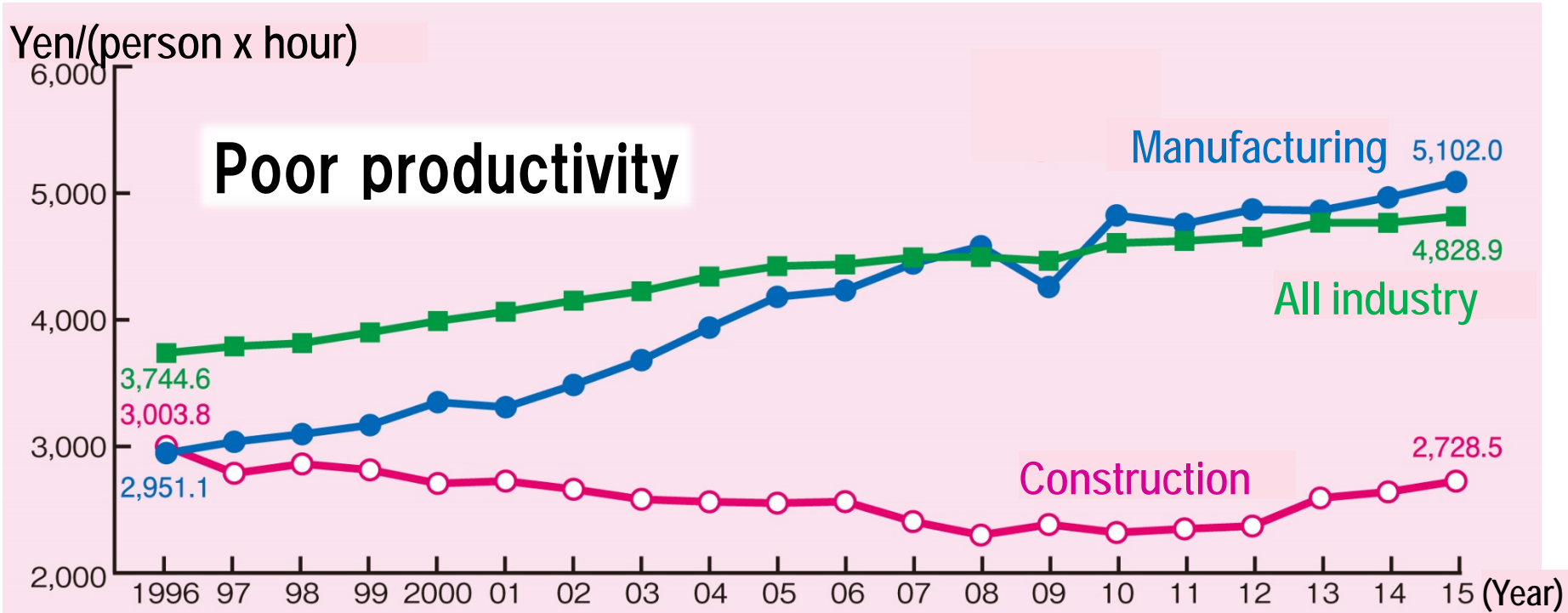
Wedge level : 76% of the all-industry average

Working hours: 118% of all-industry average

Death number : 32% of all-industries

→ **3K**

Kitsui (Hard)
Kitanai (Dirty)
Kiken (Dangerous)



Productivity = Real gross added value/(Number of employed persons x Total labor hours per year)

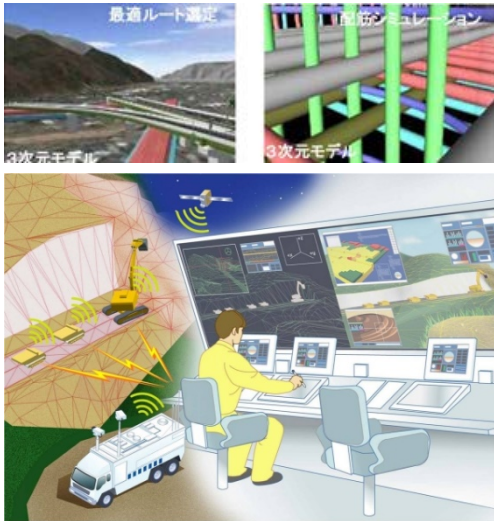
(From Japan Federation of Construction Contractors: Handbook for Construction Industry 2017)

★ Construction industry has enough potential to increase the productivity. ★

A New Policy of the Ministry of Land, Infrastructure and Transport i-Construction

Remarkable Improvements in Productivity through

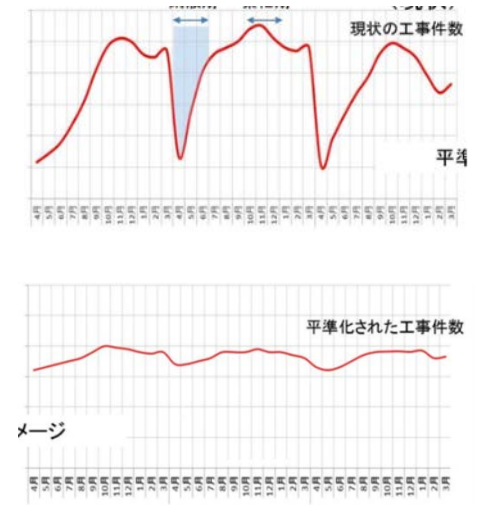
Aggressive Use of ICT in Construction



Standardization of the Specifications



Balancing of Orders throughout a year



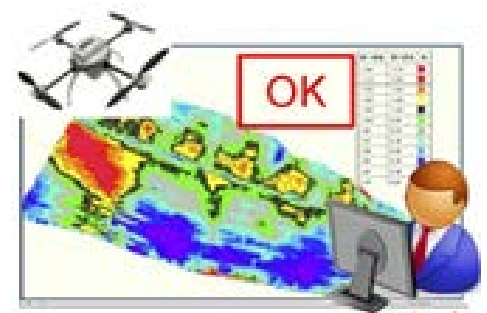
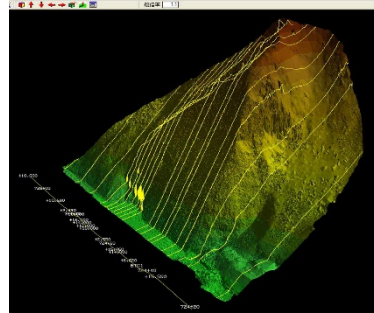
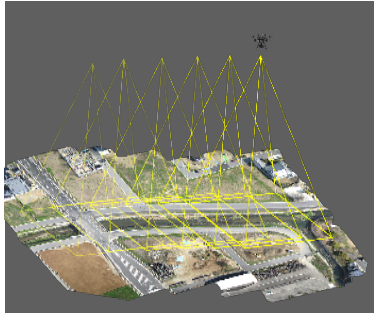
Hard
Dirty
Dangerous

High wage levels
Sufficient holidays
Safe labor environment

Drastic Development
as an industry

Aggressive Use of ICT in Earthwork

Configuration data of structures are grasped and treated **with 3D data**, and various advanced ICT tools are introduced **in i-Construction**.

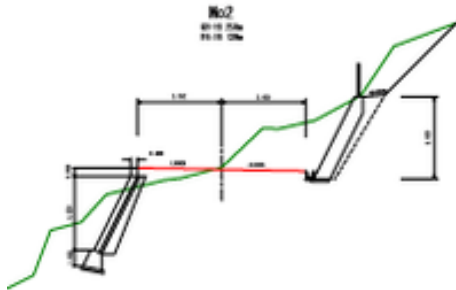


Surveying

Design
Planning

Construction

Inspection



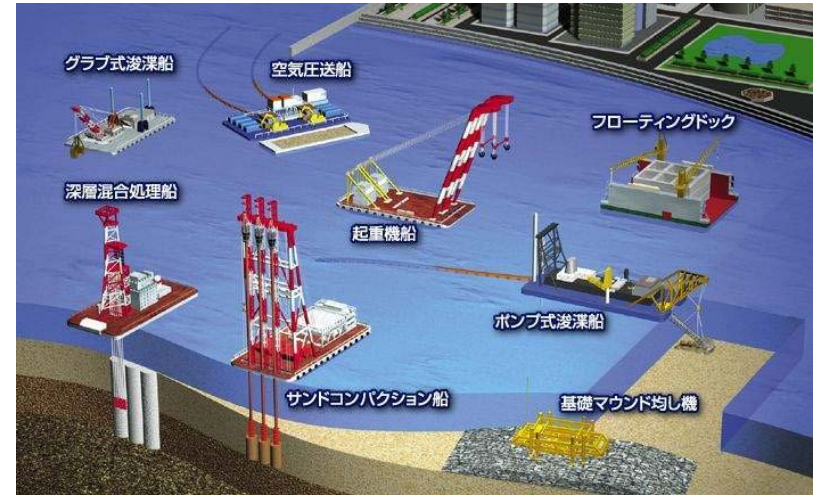
The works are executed with **2D data** at each stage **in conventional method**.

Expansion of Aggressive Use of ICT to

Paving works (2017.4～)



Dredging works (2017.4～)



Bridge construction



Sewage management



Thank you for your kind attention