

# Construction Economy Report

No. 45

## The Japanese Economy and Public Investment

Japanese Economy on the Recovery Track and  
Challenges Faced in Construction Investment

August 2005

Research Institute of Construction and Economy

(RICE)

Tokyo, JAPAN

This is an English translation of a summarized report in Japanese,  
announced in August 2005

# CONTENTS

<b>Chapter 1</b>	<b>Macroeconomics and Construction Investment</b>	<b>2</b>
		<b>[Original Japanese Version: p.1–46]</b>
1.1	Trends in the Economy and Construction Investment	
1.2	Kuznets Cycle and Construction Investment	
1.3	Local Finance – the Present and the Future	
<b>Chapter 2</b>	<b>Bidding and Contracting Systems</b>	<b>7</b>
		<b>[Original Japanese Version: p.47–70]</b>
2.1	Future Issues Concerning the “Quality Assurance Act”	
2.2	Discussion of the Defect Liability System	
<b>Chapter 3</b>	<b>The Construction Industry</b>	<b>10</b>
		<b>[Original Japanese Version: p.71–124]</b>
3.1	Baby Boomers soon to Retire Personnel Strategy of Major Construction Companies	
3.2	The Designated Managers’ System and the Construction Industry	
3.3	Management Reform Incorporating the Element of Uncertainty	
3.4	Information Technology (IT) and Electronic Commerce in the Construction Industry	
<b>Chapter 4</b>	<b>Cities and Disaster Management</b>	<b>18</b>
		<b>[Original Japanese Version: p.125–151]</b>
4.1.	Private-sector Urban Development and Finance	
4.2.	Earthquake and Disaster Preparedness of Built-up Areas: Cost and Effect	
<b>Chapter 5</b>	<b>Overseas Trends</b>	<b>22</b>
		<b>[Original Japanese Version: p.153–184]</b>
5.1	Trends in Overseas Construction Markets	
5.2	Government and Water Resource Management (U.S. Army Corps of Engineers in Trouble)	

For further information please contact: Hisashi Mori (Executive Director) Atsushi Suzuki (Research Director) Yutaka Shoda (Senior Researcher) e-mail: info@rice.or.jp
---

## Chapter 1 Macroeconomics and Construction Investment

### 1.1 Trends in the Economy and Construction Investment

- There are signs that the Japanese economy in FY2005 and FY2006 is, at long last, beginning to pick up. Favorable signs in the business sector are spreading to the household sector. We should, however, keep an eye on the slowing down of overseas economies, inventory adjustment in the IT sector, and reactions to increased public works spending for disaster recovery projects.
- The fall in construction investment will continue in FY2005 and FY2006, although the rate of decline will decrease due to a supplementary budget for disaster recovery. Private-sector non-housing construction investment is strong, reflecting the economic recovery, while public-sector construction investment is likely to continue to shrink. Private-sector housing investment is likely to level off.

### Trends in construction investment (Nominal, FY)

	Actual		Tentative		Forecast				
FY	1990	1995	2000	2001	2002	2003	2004	2005	2006
Nominal CI (Increase rate)	81,440 11.4%	79,017 0.3%	66,195 -3.4%	61,288 -7.4%	56,840 -7.3%	53,940 -5.1%	52,770 -2.2%	52,130 1.2%	50,880 -2.4%
Nominal government CI (Increase rate) (Contribution rate)	25,748 6.0% 2.0	35,199 5.8% 2.5	29,960 -6.2% -2.9	28,193 -5.9% -2.7	25,917 -8.1% -3.7	23,720 -8.5% -3.9	21,080 -11.1% -4.9	19,780 -6.2% -2.5	18,120 -8.4% -3.2
Nominal private housing CI (Increase rate) (Contribution rate)	25,722 9.3% 3.0	24,313 -5.2% -1.7	20,276 -2.2% -0.7	18,575 -8.4% -2.6	17,951 -3.4% -1.0	17,880 -0.4% -0.1	18,270 2.2% 0.7	18,280 0.1% 0.0	18,440 0.9% 0.3
Nominal private NH CI (Increase rate) (Contribution rate)	29,970 18.4% 6.4	19,505 -1.8% -0.4	15,959 0.7% 0.2	14,519 -9.0% -2.2	12,972 -10.7% -2.5	12,340 -4.9% -1.1	13,420 8.8% 2.0	14,070 4.8% 1.2	14,320 1.8% 0.5
Real CI (Increase rate)	85,442 7.7%	79,017 0.2%	67,365 -3.6%	62,929 -6.6%	58,639 -6.8%	55,170 -5.9%	53,390 -3.2%	52,550 -1.6%	51,132 -2.7%

(Units: billion yen. Real figures are based on 1995 prices.)

Notes:

1. CI: construction investment NH: non-housing
2. Private NH CI = private non-housing construction investment + private civil engineering investment.

## 1.2 Kuznets Cycle and Construction Investment

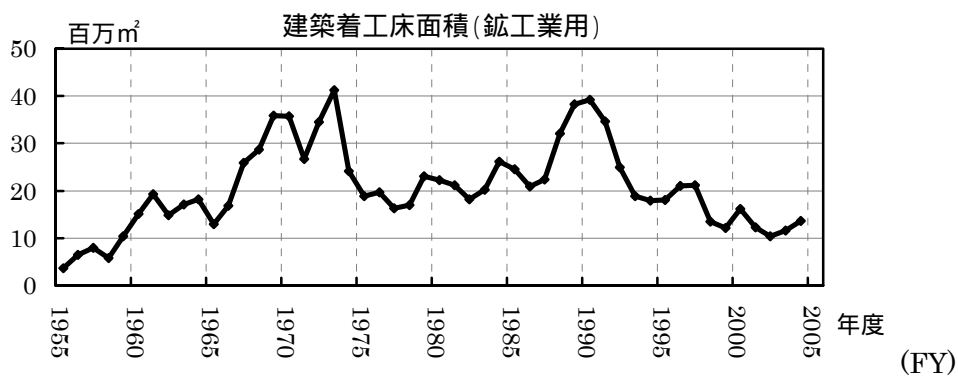
- An economy has both ups and downs. The cycle of recession and recovery cycle is called the business cycle. In this section we examine why the Japanese economy did not exhibit a strong recovery following the collapse of the “bubble economy” from the standpoint of the business cycle.
- The Kuznets cycle (a form of long-term business cycle) was on the downward phase in the 1990s. Investment made during the upward phase produced non-performing assets, and the influence of the decline in investment spread. The economy can break out of the downward phase only after businesses dispose of non-performing assets and these begin to circulate in the real economy.
- There are signs that the Japanese economy is finally pulling up out of the downward phase. Current quantitative monetary easing policy should be continued to lead this trend to a full-fledged recovery.

### Kuznets Cycle

The Kuznets Cycle is consistent with the building cycle.

### Floor area of building construction starts (Mining and manufacturing)

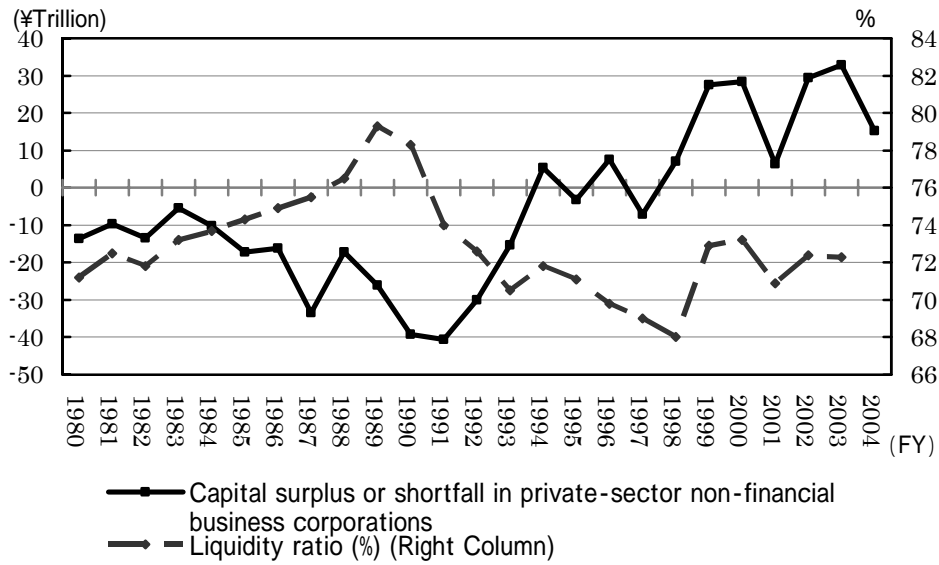
(Million m<sup>2</sup>)



Note: Graph compiled by RICE based on a graph in Chapter 1 of “Introductory Seminar on Business Cycle” (by Yuji Shimanaka) edited by Hisao Kanamori and the Society of Business Cycle (Toyo Kezai Shinpo, 2002) and data from the Ministry of Land, Infrastructure and Transport.

### The Effect of Bank of Japan's Monetary Policy

Corporate financial conditions are improving. Money for investment is accumulating due to an easing of monetary policy of the Bank of Japan.

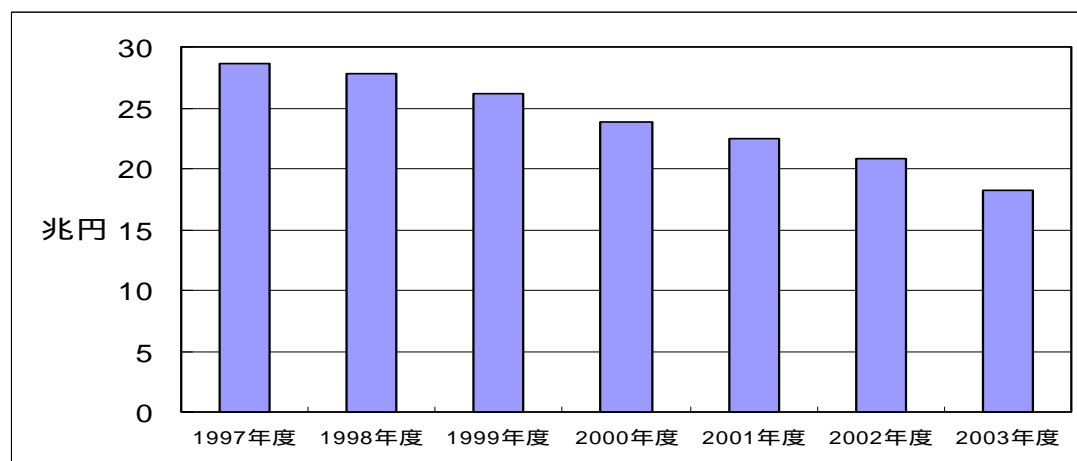


Note: Liquid ratio = (Cash and deposits + Bills receivable + Securities) / Current debt

### 1.3 Local Finance – the Present and the Future

- The national government, in an attempt to reverse the primary balance deficit, will supply less money to local governments, placing them in financial difficulty.
- About 40% of the ordinary construction project expenditure of local governments is appropriated through the issuance of local bonds, which are underwritten more through public offerings in the market and banks but less by national government funding as a result of the reform of the government's investment and loan programs.
- It is clear that local governments will be forced to take responsibility for their own financial affairs and will need to diversify their methods of financing.
- Publicly offered small-scale local bonds (“Mini Publicly Offered Local Government Bonds for Resident Participation”), which make it easier for local citizens to invest in projects, are new initiatives that enable local governments to address the problem of the national government’s reduction in participation in underwriting following the reform of the government's investment and loan program. This initiative has three purposes: a) shifting procurement from public to private sectors, b) diversifying the financing methods of local governments, and c) involving more citizens in local governance.

Trends in Ordinary Construction Project Expenditure  
( ¥Trillion )



( FY )

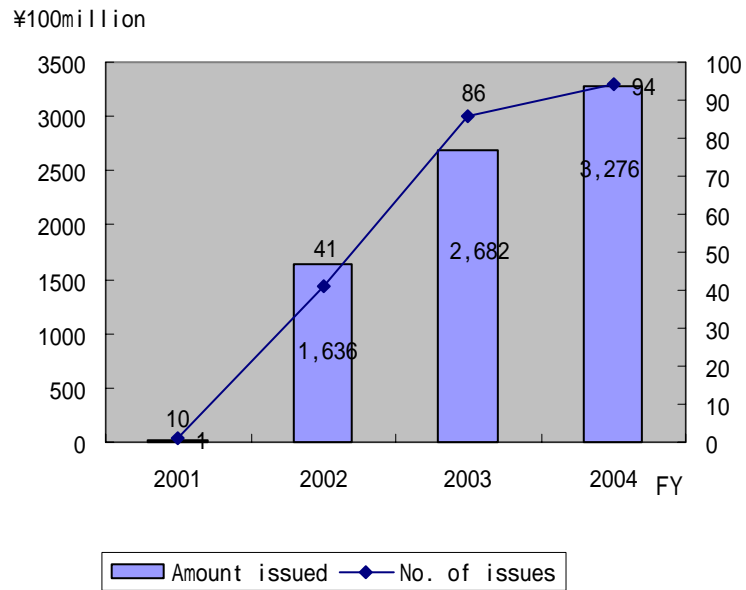
Local bonds still account for a high proportion of the revenue of the declining ordinary construction project expenditure. Since local governments will get less and less money from the national government due to the so-called “Trinity Reform” (reform of fiscal relations between the national and local governments), they should diversify their financing methods.

#### Trends in Mini Publicly Offered Local Government Bonds for Resident Participation

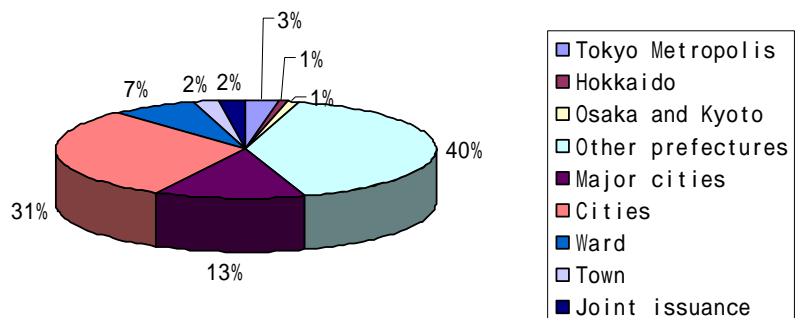
The system of “Mini Publicly Offered Local Government Bonds for Resident Participation” entered full-scale operation in FY2002. Total issuance, which is

increasing every year, stood at 76.04 billion yen at the end of FY2004. The amount scheduled to be issued in FY2005 based on the Local Bond Plan is 33 billion yen, which is about the same as in FY2004.

**Trends in the issuance of Mini Publicly Offered Local Government Bonds for Resident Participation**



**Classified by type of government issuing Mini Publicly Offered Local Government Bonds for Resident Participation**



## Chapter 2 Bidding and Contracting Systems

### 2.1 Future Issues Concerning the “Quality Assurance Act”

- The Act for Promoting Quality Assurance in Public Works (“Quality Assurance Act” went into effect on April 1, 2005. The Act sets forth the concept of public procurement based on overall evaluation, combining price and the technical expertise of the contractor, to assure the quality of public works projects. There are, however, several hurdles to overcome before the concepts and goals set in this Act can be put into practice.
- A questionnaire survey conducted by RICE on local governments of populations of 100 thousand or over reveals that smaller municipalities lag behind prefectures and major cities (Cabinet Order designated cities) in developing procurement systems.
- Upper-tier governments should support these smaller local governments so that they can set up systems to ensure the adequate operation of the Act.

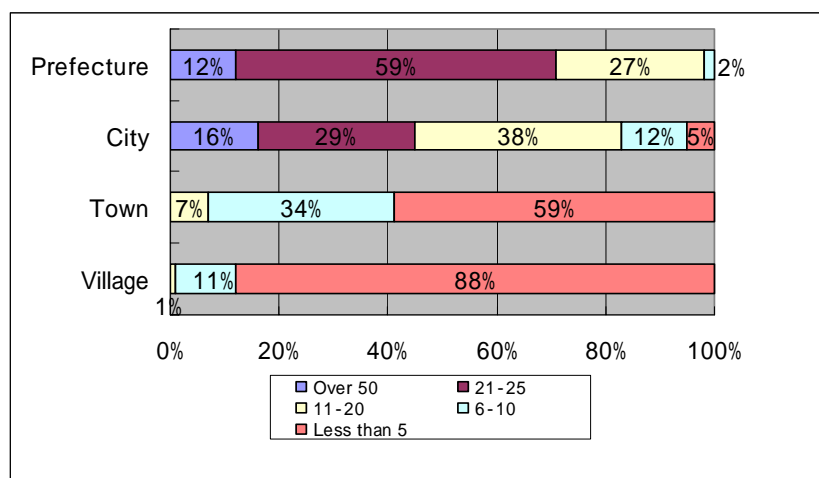
#### Major Points of the “Quality Assurance Act”

- Basic philosophy of Quality assurance of public works projects and responsibility of the procurers are clarified
- A shift from “price competition” to “good procurement based on overall evaluation of both price and quality”
- Mechanism for supporting procurers clarified

#### Current status of Procurement systems of local governments

- Local governments, smaller municipalities in particular, do not have adequate systems for ensuring the quality of public works projects. They are not quite ready to realize the concepts and ideas set in the act.

**No. of supervising staff by the types of the procurers**





### The “Quality Assurance Law” and its Issues

- Most procurers are not yet ready to implement the “Overall Evaluation and Bidding System” in which bidding and contracting is based on the technical expertise of the bidder in addition to their price. This is because it takes an enormous amount of effort and time to establish evaluation criteria (other than price) and gather opinions and advice from academic experts on how to do the screening.
- Even after the “Overall Evaluation and Bidding System” becomes widely used, price will still be a pivotal evaluation criterion.
- Local governments have been asked to prepare systems for supervision, inspection and rating, based on the guideline on proper bidding and contracting systems. Half of the municipalities have not yet prepared these systems. Prompt preparations should be made.

## 2.2 Discussion of the Defect Liability System

- Assurance of the quality of public works projects is indispensable to protect the public. Examination of defect liability systems is beneficial to both the procurer and the bidders, and uncovers ways to ensure the quality of public works projects and root out companies who lack credibility and technical competence.
- A defect liability system should: a) clarify the responsibilities of both the procurer and the contractor, b) clearly define what defects are to be warrantable, and c) accumulate data about defects.
- The significance of a defect liability system is that it can protect the procurer after the completion of the project. On the other hand, companies who lack credibility and technical competence should be eliminated from the bidding process. For this purpose, the introduction of the bid bond system should be examined.

### Defect Liability Systems in Other Countries

Country	Warranty Period	Rate and Means of Insurance
USA	One year in principle for projects ordered by the federal government (several years for some types of works and maximum 10 years). One year, in many cases, for projects ordered by state governments (several years depending on the procurer and the type of work).	Federal government: When a warranty bond accompanies a performance bond, insurance cover is 100%, as in the case of performance bond. State government: Coverage of insurance of performance bond differs by the state. When a warranty bond accompanies a performance bond, the insurance cover is 25 to 100%. When both federal and state governments require a warranty bond, the rate of insurance cover is set by the procurer, usually between 10 and 20%.
France	10 years for construction projects, 2 years for separable facilities. The warranty for completed works is 1 year for both civil engineering and construction projects.	Mandatory insurance when held liable for defects for 10 years (incurring losses all covered). Voluntary insurance when the warranty period is 2 years. There is an insurance withholding system (up to 5% of the contracted amount) for a 1-year warranty for completed works. This can be substituted by either "payment on application" insurance guaranteed by the bank (needs to be agreed by the procurer) or "insurance by the joint guarantor" (needs to be agreed by the procurer).
Korea	1-10 years depending on the types of work.	Should deposit 2-5% of the contracted amount to cover defect repair, depending on the type of work. Can be substituted if guaranteed by the Construction Mutual Aid Association or an insurance company
UK	Usually 1 year.	When a warranty bond accompanies a performance bond, insurance cover is 10%, as in the case of a performance bond. When these two bonds are separated, the rate of cover seems to range between 1.5% and 5%. Payment retention seems to be around 5%

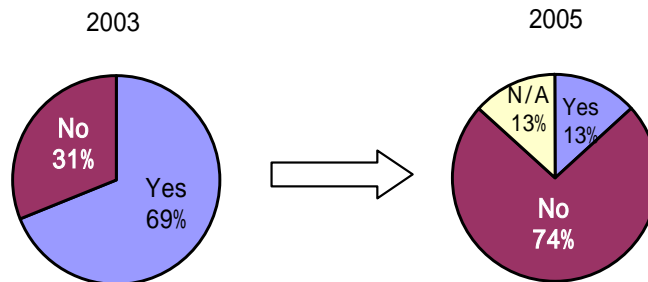
## Chapter 3 The Construction Industry

### 3.1 Baby Boomers soon to Retire – Personnel Strategy of Major Construction Companies

- Members of the baby-boomer generation will soon reach age 60. Fewer major construction companies consider that they are over-staffed.
- RICE estimates that between 2003 and around 2010 (when all baby boomers will be in their 60s) the number of employees and personnel expenses of major construction companies will decrease by 16.7% and 17.1%, respectively (only natural decreases considered).
- Companies will thus be forced to operate with fewer staff and to achieve a proper staff portfolio will be increasingly important as part of their personnel strategy to maintain or increase their competitiveness.

Do construction companies feel they are overstaffed?

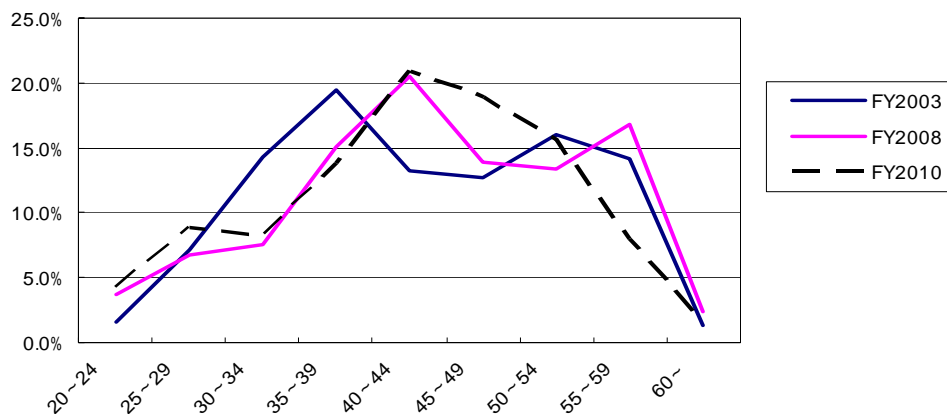
RICE has asked major construction companies (on RICE's list and whose accounts are analyzed on a regular basis) whether they consider themselves overstaffed or not. The following graph shows the change from 2003 to 2005.



\* Compiled from a questionnaire survey on construction companies' employment and personnel strategy conducted by RICE.

Estimate on age structure of employees and personnel expenses for FY2008 and FY2010

**( Age structure of employees )**



\* Compiled from the above survey and data from the Ministry of Health, Labour and Welfare.

**(Estimate of percentage change in the number of employees and personnel expenses)**

	2003 2010	2003 2008	2008 2010
No. of employees	-2.39%	-1.16%	-5.81%
Total amount of wage	-2.44%	-0.72%	-6.98%

\* Calculated from the estimate of employee age structure. The figures are average annual change rate during each period.

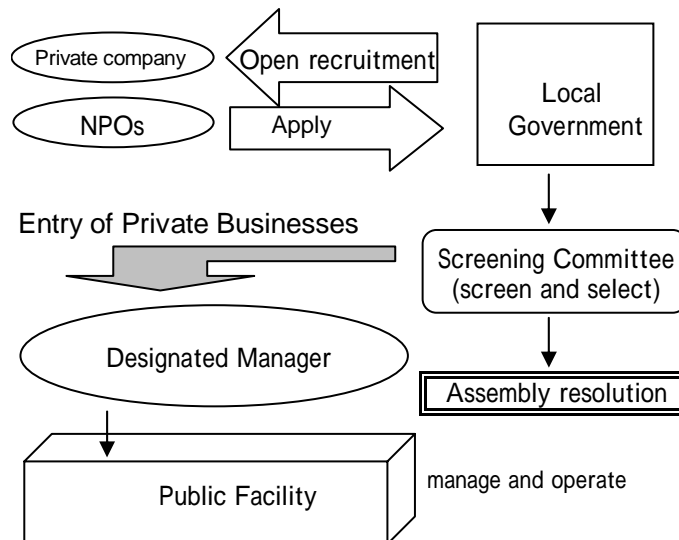
### 3.2 The Designated Manager System and the Construction Industry

- The Local Autonomy Law amended in September 2003 introduced the “Designated Manager System,” which allows local governments to choose private organizations to run their facilities (Previously, public facilities were self-managed by the local government itself or by foundations).
- The expected merits of the new system include: a) improved user convenience at facilities, and b) reduced management expenses.
- Some private businesses see great business potential in the new system. In this report, RICE examines how construction companies view this system and how they will respond to it

#### The Designated Manager System

Under the basic national policy of the structural reform (“from public to private”) the government has discussed the possibility of allowing private-sector businesses to manage public facilities. The government amended the Local Autonomy Law in September 2003 to introduce the Designated Manager System. Until then, public facilities could only be managed by the government itself or by organizations that were public in nature.

#### How the “Manager” (operator) is selected and designated



#### Outline of the System and Expected Benefits

Under the new system, private organizations will be able to manage public facilities and grant permission to use. The new “managers” simplified paperwork and speeded up decision-making processes to increase the level of convenience to users. Local governments expect that they can reduce operating costs by imposing user fees and utilizing private-sector expertise.

### Construction Companies and the Designated Manager System

RICE conducted a questionnaire survey on 42 major construction companies (a response rate of 52.4%). The results are shown below:

Will the company apply (or think about applying) to be a manager (operator)?		The company thinks the Designated Manager System is:	
Don't know, not decided	31.8%	A business opportunity	25.0%
A certain section may	22.7%	A part of PFI business, etc.	20.8%
Maybe in the future	18.2%	Interesting but not yet thinking about it	20.8%
No plan	18.2%	Not important	12.5%
Other	9.1%	Other	20.8%

#### Discussion of the Results of the Survey

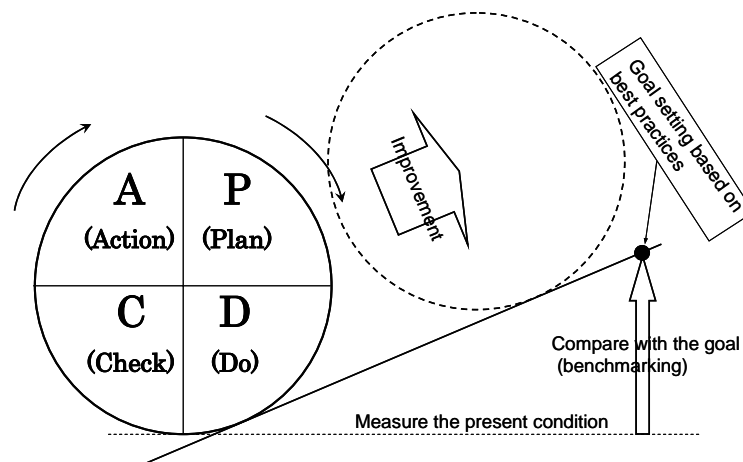
- The Designated Manager System emphasizes the “management” of facilities, which makes it difficult for construction companies specializing in “building” the facilities to enter the market. The system does offer the following business opportunities: a) new business fields that smaller companies may consider entering, b) new business for building maintenance companies affiliated with construction companies, c) the opportunity to be a partner in Public-Private Partnerships (PPP), and d) use as a business tool to win contracts for facility repair and maintenance.

### 3.3 Management Reform Incorporating the Element of Uncertainty

- There is a high level of uncertainty in construction production. Productivity levels are largely determined by management ability, but traditional management methods tend to rely on experience and instinct and are often incapable of coping with uncertainty. The construction production system should be reformed by introducing the element of uncertainty by learning from the systems and practices of other industries and of other countries.
- In the US and UK, “performance measurement” using quantitative indices of performance and “continuous improvement” of performance are considered essential to increase construction productivity.
- Critical Chain Project Management (CCPM) and the Last Planner System are examples of new management methods to reduce uncertainty.

#### Uncertainty and the Restructuring of the Construction Production System

Good management that copes with uncertainties such as the weather and interrelated factors is the key to boosting construction productivity. This will require strategies to improve construction organizations, encourage the introduction of the management cycle (PDCA) and improve performance on a continuous basis. Good procedures, including “Plan” and “Check” policies, are essential. Performance measurement is a prerequisite of “Check” policies.



#### Construction Production System Reform in the US and Europe

- The US Civil Engineering Research Foundation (CEFR) proposed in 2003 that the “construction industry should unite and measure performance to increase industry productivity.” The Construction Industry Institute (CII) has invited companies to participate and is measuring their performance on an annual basis.
- A “partnering” approach to establish a long and stable team of construction companies and “performance measurement and continuous improvement” are some of the attempts seen in the UK to improve construction performance. The Office of Government Commerce (OGC) utilizes key performance indicators (KPIs) of the Department of Trade and Industry (DTI) to address the performance

improvement of procurers. The “Clients Charter” is designed to involve clients in the process of introducing cultural change within their organizations.

#### New Management Methods that take Uncertainty into Consideration

- The Critical Chain Project Management (CCPM) is a paradigm for effective project management. CCPM improves the project plan by ensuring that it is feasible and free from uncertainty. In the planning processes, CCPM eliminates interdependencies between tasks due to resource dependencies (e.g., labor force, material and equipment) and adds a Critical Chain Feeding Buffer to ensure that the project is completed on time.
- The Last Planner System is a construction production control and workflow system incorporating “Look Ahead” planning and “Protection” from uncertainty. It uses the quantitative performance index Percent Plan Complete (PPC) to continuously improve performance.



### **3.4 Information Technology (IT) and Electronic Commerce in the Construction Industry**

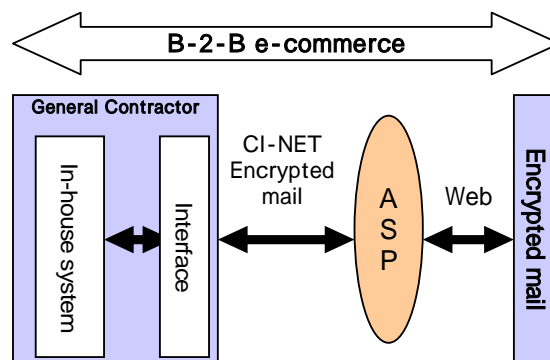
- The construction industry is now better equipped with PCs and advanced IT systems. Large companies now utilize IT systems to increase business efficiency, while smaller companies are more focused on CALS/EC.
- As access to broadband improves, major general contractors are quickly entering B-2-B e-commerce utilizing ASP (Application Service Provider) services.
- Further proliferation of e-commerce requires the smaller general contractors and specialized companies to come on board. ASP is crucial to this process.

#### IT and Construction Companies

- More construction companies have PCs and are connected to the Internet. A questionnaire survey shows that 90.3% of large companies and 78.8% of medium-sized and small companies have more than 7 PCs per 10 office workers.
- More companies are prepared to introduce CALS (“Continuous Acquisition And Lifecycle Support” or “Commerce At Light Speed”) and EC (Electronic Commerce), and are ready to take part in electronic bidding and electronic delivery. Electronic procurement has not yet penetrated the industry. The questionnaire survey shows that only 6.2% of labor procurement and 4.3% of material procurement is via electronic procurement.
- Large companies now utilize IT systems to increase business efficiency while smaller companies are more focused on CALS/EC.

## Electronic Commerce in the Construction Industry

- More companies have introduced CALS/EC and are taking part in electronic bidding and electronic delivery. On the other hand, B-2-B e-commerce enabling procurement of labor and material has not been widely adopted.
- With the diffusion of the broadband service major general contractors are quickly expanding B-2-B e-commerce by utilizing ASP (Application Service Provider) services. At the same time, they have restructured in-house systems to electronically process all steps of the procurement business.



## Construction Industry Adopting e-commerce

- E-commerce may widen the gap among companies in terms of business efficiency. E-commerce is a big challenge for the second-tier to smaller general contractors.
- ASP services lower the hurdles for specialized contractors reluctant to become involved in e-commerce. ASP is a cost-effective and easy-to-operate service that benefits medium-sized and small general contractors.
- With the expansion of the e-commerce, training and support for specialized contractors is likely to become an industry-wide challenge.
- B-2-B e-commerce is just beginning to pay off through the e-marketplace. B-2-B e-commerce is entering its second stage of growth as the e-marketplace becomes established.

## Chapter 4 Cities and Disaster Management

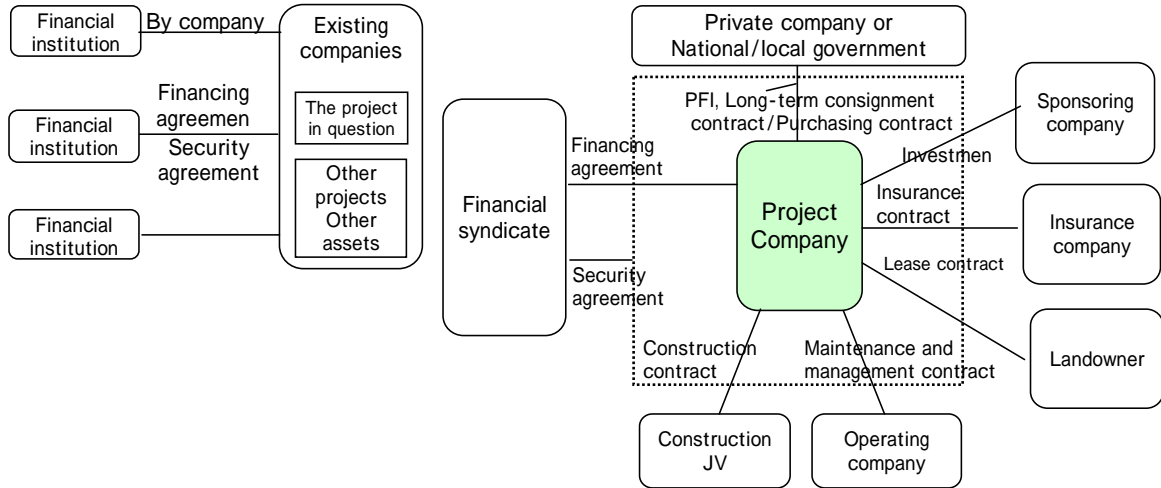
### 4.1 Private-sector Urban Development and Finance

- Private-sector urban development by major construction companies and developers is being revitalized as the Japanese economy emerges from a recession. Demand for capital has increased. A wider range of financing methods is being used to procure project funds.
- A questionnaire survey by RICE of major and second-tier construction companies and major developers revealed that the percentage of companies utilizing financing methods including real estate securitization and non-recourse loans has increased significantly since the 1990s. Over 80% of the companies responded they would like to use these methods more. The results clearly indicate that they are shifting to project financing methods.
- Urban development projects have two stages; development and ownership. New methods utilizing different financing for each stage are emerging. Proper use is the key to successful project financing.
- Further diversification and enhancement of financing methods is indispensable for smooth and efficient private-sector urban development.

#### Corporate Finance and Project Finance

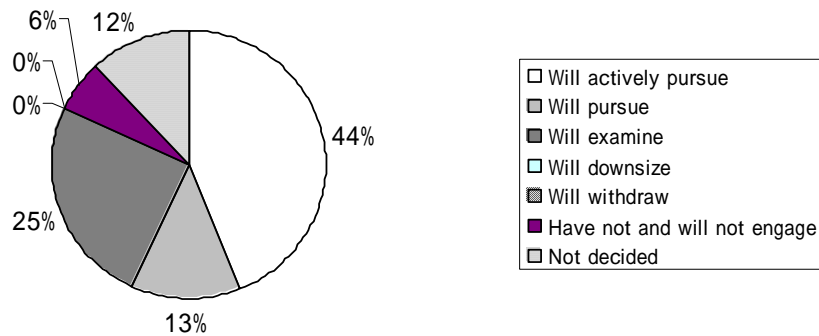
Financing methods are shifting from corporate finance, based on the company's creditworthiness, to project finance (in the broad sense of the term) based on the profitability of the project.

	<b>Corporate Finance</b>	<b>Project Finance</b>
Operating body	Borrower	Capital investor
Borrower	Existing company	Special-purpose company
Repayment resource	Operating revenue of the company as a whole	Profit from the project per se
Collateral	Corporate creditworthiness and property	Asset and rights of the project
Examination	Financial analysis and business forecast of the company	Project profitability and risk



### Future Involvement in Private-sector Urban Development

The graph below is the result of a questionnaire survey of major and second-tier construction companies and major developers (42 companies), regardless of their experience in private-sector urban development projects.



#### 4.2 Earthquake and Disaster Preparedness of Built-up Areas: Cost and Effect

- The probability of an earthquake registering 6 or higher on the Japanese seismic scale striking within the next 30 years is quite high in many parts of Japan, especially Tokyo and the Tokai and Kinki Regions where Japan's population and economic strength is concentrated.
- There have been calls for the seismic retrofitting and redevelopment of built-up areas since the Great Hanshin-Awaji Earthquake of 1995. In spite of numerous government policies, little progress has been achieved.
- The current issue of the Construction Economy Report compares two adjacent built-up districts: one redeveloped and one not, both hit hard by the Great Hanshin-Awaji Earthquake, in terms of financial losses per household and per area.
- Losses suffered in the redeveloped district were only about one-third to one-fourth of those in the unimproved district.

#### 1. Probability of occurrence of earthquake of intensity 6 and greater within the next 30 years

(%)

Urakawa (Hokkaido)	32.1	Kofu (Kanto)	81.6	Kochi (Shikoku)	48.2
Kushiro (Hokkaido)	17.0	Shizuoka (Tokai)	86.1	Matsuyama (Shikoku)	19.9
Nemuro (Hokkaido)	43.4	Nagoya (Tokai)	35.8	Takamatsu (Shikoku)	19.0
Saitama (Kanto)	11.9	Tsu (Tokai)	58.5	Tokusima (Shikoku)	41.8
Chiba (Kanto)	27.1	Osaka (Kinki)	21.5	Oita (Kyushu)	14.2
Shinjuku (Tokyo)	11.2	Nara (Kinki)	14.9	Miyazaki (Kyushu)	11.9
Yokohama (Kanto)	32.4	Wakayama (Kinki)	32.2	Naha (Okinawa)	10.3

Data from the Headquarter for Earthquake Research Promotion of the Ministry of Education, Culture, Sports, Science and Technology.

#### 2. Outline of two districts (the redeveloped Kawara District and the unimproved Rokkomichi Station North District) in Kobe's Nada Ward

		Kawara District (redeveloped)	Rokkomichi Station North District
Area (m <sup>2</sup> )		92,725	228,488
No. of sub-districts		7	14
District population (1990 Census)	No. of households	599	2,185
	Population	1,417	4,952
Types of buildings (%) (FY 1990)	Wooden	67.8	68.2
	Non-wooden	32.2	31.8
Affected wooden buildings (%)	Destroyed	17.9	61.6
	Half destroyed	9.4	15.6
	Partly destroyed	25.1	15.0
	Not affected	47.5	7.9
Casualties	Dead	7	81
	Injured	38	145

### 3. Estimate of Losses

#### Kawara District (redeveloped)

	Loss*	Loss adjusted to per house		Loss adjusted to per 100 m <sup>2</sup>	
		No. of houses	Loss*	Total area	Loss *
House Destroyed	765,230	296	2,590	927	830
Half destroyed	205,310	296	690	927	220
Property collapsed	111,520	296	380	927	120
(House destroyed then collapsed)	149,240	296	500	927	160
<b>Physical loss total</b>	<b>1,231,290</b>		<b>4,160</b>	<b>927</b>	<b>1,330</b>
		No. of houses	Loss*	Total area	Loss *
Dead	215,810	296	730	927	230
Injured	37,560	296	130	927	40
<b>Human loss total</b>	<b>253,370</b>	<b>296</b>	<b>860</b>	<b>927</b>	<b>270</b>
<b>Physical &amp; human loss total</b>	<b>1,484,670</b>	<b>5,020</b>		<b>1,600</b>	

\* Unit: thousands of yen

#### Rokkomichi Station North District (unimproved)

	Amount of loss (in thousand yen)	Loss adjusted to per house		Loss adjusted to per 100 m <sup>2</sup>	
		No. of houses	Loss*	Total area	Loss *
House Destroyed	7,801,600	760	10,270	2,285	3,410
Half destroyed	1,026,530	760	1,350	2,285	450
Property collapsed	1,136,960	760	1,500	2,285	500
(House destroyed then collapsed)	1,521,520	760	2,000	2,285	670
<b>Physical loss total</b>	<b>11,486,610</b>		<b>15,110</b>	<b>2,285</b>	<b>5,030</b>
		No. of houses	Loss*	Total area	Loss *
Dead	2,497,230	760	3,290	2,285	1,090
Injured	144,750	296	190	2,285	60
<b>Human loss total</b>	<b>2,641,980</b>	<b>296</b>	<b>3,480</b>	<b>2,285</b>	<b>1,160</b>
<b>Physical &amp; human loss total</b>	<b>14,128,590</b>	<b>18,590</b>		<b>6,180</b>	

\* Unit: thousands of yen

### 5.1 Trends in Overseas Construction Markets

- When construction investment in Japan is equated to 100, the corresponding figures are 197 for the United States, 138 for Western Europe, 6 for Eastern Europe, and 152 for Asia.
- The proportion of construction investment out of total GDP is 10.8% for Japan and 19.1% for Asia. This figure is lower in the United States (8.3%), Western Europe (5.9%) and Eastern Europe (6.5%).
- US construction investment is expected to be a record-high of 1.1030 trillion dollars in 2005. Both public- and private-sector investment are strong, driven by private-sector housing that accounts for more than 50% of the total investment.

**Construction markets by country and by region in 2003  
(nominal values, converted to trillions of yen)**

	Japan <sup>1</sup>	United States	Western Europe <sup>2</sup>	Eastern Europe <sup>3</sup>	Asia <sup>4</sup>
GDP	501.3 (100)	1,274.0 (254.2)	1258.3 (255.0)	48.3 (9.5)	429.2 (85.6)
Construction market	65.0 (100)	-	132.9 (204.4)	4.6 (7.1)	-
Proportion to GDP (%)	13.0	-	10.6	9.6	-
Construction Investment	53.9 (100)	106.2 (196.8)	74.3 (137.8)	3.1 (5.8)	82.1 (152.4)
Proportion to GDP (%)	10.8	8.3	5.9	6.5	19.1

(Japan = 100)

#### Notes

1. Data for Japan is fiscal year (FY)-based. The amount of construction investment is an outlook (by the Ministry of Land, Infrastructure and Transport).
2. "Western Europe" consists of 15 countries: Austria, Belgium, Denmark, Finland, France, Germany, Iceland Ireland, Italy, The Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and UK.
3. "Eastern Europe" consists of 4 countries: Czech Republic, Hungary, Poland and Slovakia.
4. "Asia" includes 12 countries and territories: China, Hong Kong, Taiwan, India, Indonesia, Korea, Malaysia, The Philippines, Singapore, Sri Lanka, Vietnam and Thailand. Construction investment data for China and Hon Kong is as of 2002, for The Philippines, Taiwan and Thailand is as of 2000, and for Indonesia and Vietnam are as of 1998. The amount of orders received for construction work is used instead of construction investment amount for Malaysia.

US GDP growth in the first quarter of 2005 was 3.8%, similar to that of the previous quarter. Consumer spending, accounting for about 70% of total GDP, slowed slightly, but housing investment remained strong. The construction investment forecast of 2005 is a record high of 1.1030 trillion dollars. Public investment, particularly investment in roads and educational facilities accounting for about 60% of overall investment, is continuing to grow. Housing starts and sales of both new and second-hand houses increased from the previous year. Over 7 million second-hand houses were sold, which stimulated housing prices. Mortgage interest rates decreased for three consecutive months, despite of rising short-term interest rates. The housing market will thus continue to be favorable. Unemployment at 5.0% was at its lowest level in about three years and nine months. The number of construction workers is increasing, supported by the high demand for housing.

## Trends in US construction Investment

(Upper column: volume in \$1m, Lower column: increase rate over the previous year in %)

	1990	1995	2000r	2001r	2002r	2003r	2004r	2005p	Composition ratio
New investment total	476,778	557,818	835,279	868,310	876,802	925,069	1,027,736	1,102,983	100.0
	-0.2	3.5	8.6	4.0	1.0	5.5	11.1	7.3	
Private-sector	369,300	427,885	649,750	662,247	659,651	701,601	798,487	856,210	77.6
	-2.6	2.1	8.3	1.9	-0.4	6.4	13.8	7.2	
Housing	191,103	247,351	374,457	388,324	421,912	475,941	563,376	614,269	55.7
	-6.4	-4.3	6.8	3.7	8.6	12.8	18.4	9.0	
Non-housing, etc	143,506	180,534	275,293	273,922	237,739	225,660	235,110	241,942	21.9
	2.5	12.5	10.5	-0.5	-13.2	-5.1	4.2	2.9	
Public works	107,478	129,933	185,529	206,063	217,150	223,468	229,250	246,773	22.4
	9.5	8.1	9.3	11.1	5.4	2.9	2.6	7.6	
Building	N/A	N/A	N/A	N/A	129,719	134,022	137,733	146,463	13.3
	N/A	N/A	N/A	N/A	N/A	3.3	2.8	6.3	
Civil engineering, etc	N/A	N/A	N/A	N/A	87,431	89,446	91,517	100,310	9.1
	N/A	N/A	N/A	N/A	N/A	2.3	2.3	9.6	

Notes:

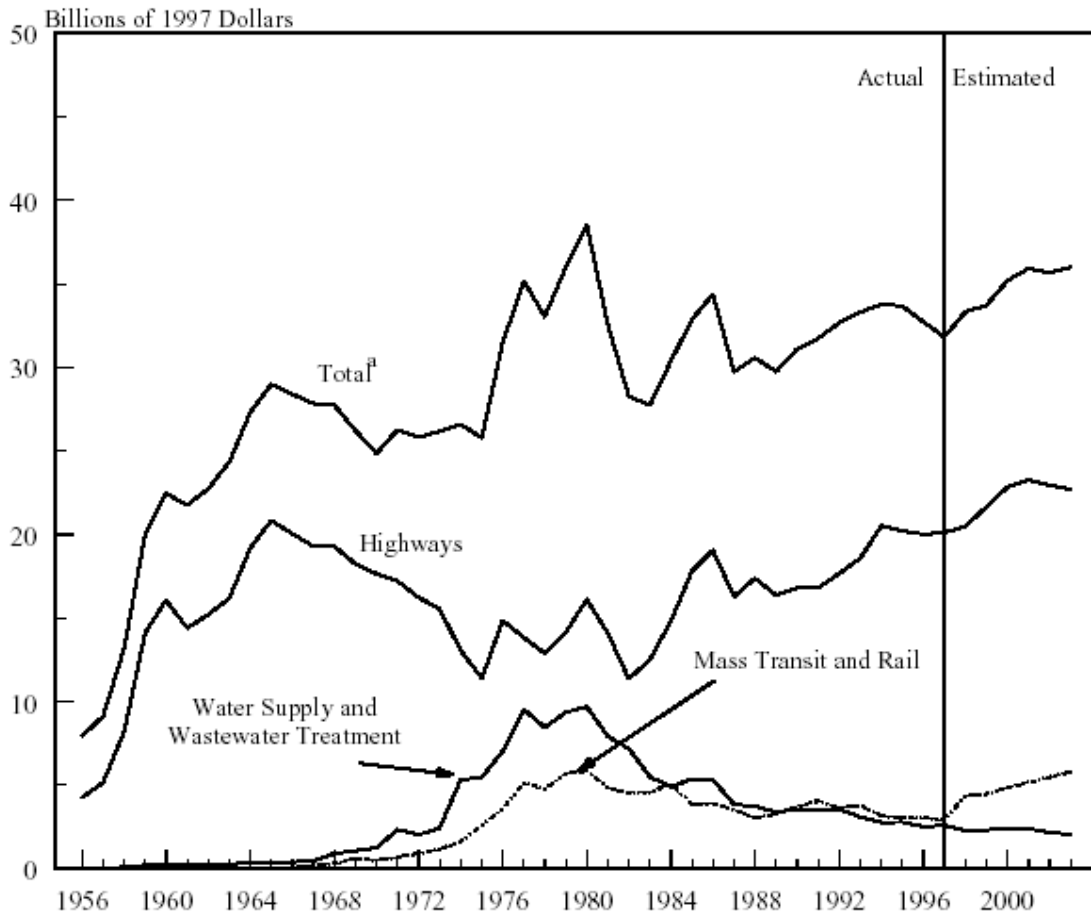
1. Compiled based on data from the Department of Commerce.
2. (r): revised, (p): preliminary
3. Figures for 2005 are seasonally adjusted figures as of May converted to annual figures.

### 5.2 Government and Water Resource Management (US Army Corps of Engineers in Trouble)

- Most dams and weirs in the US were built by the Federal Government's Department of the Interior (Bureau of Reclamation), the Army Corps of Engineers and the Tennessee Valley Authority (TVA) during the 1950s and 1970s. The total storage capacity is 28 times that of Japanese dams and the per-capita storage capacity is 13 times.
- The federal water resource development is thus shifting from the construction of new facilities to the management of existing facilities and the coordination of systems and policies.
- Most dams and weirs (the bank height should be at least 15 meters to be called a "dam" in Japan) that have been demolished are the smaller ones built before the first half of the 20th century that had deteriorated and were too costly to maintain.
- The Army Corps of Engineers is responsible for nationwide water resource development other than that carried out by the Department of the Interior's Bureau of Reclamation in the West. In the wake of the 2000 scandal involving the fiddling of cost-benefit books, the Army Corps of Engineers has been criticized for their prioritizing of large-scale projects, the powerful combination of lawmakers, the Corps and stakeholders (called the "iron triangle" and criticized by environmental groups). The Corps has proposed several reform plans, including a shift to more efficient organization and management, and a change in project evaluation methods.
- The progress of reform, however, has been slow, since this would drastically reduce the number of personnel. The Corps is wary of legislature seeking to promote large-scale projects. The Corps is faced with mounting problems.



**Federal Capital Spending For Selected Types Of Infrastructure  
(1956-2003)**



SOURCE: Congressional Budget Office.

NOTE: Spending levels for 1956 through 1997 are actual expenditures. Estimated expenditures for highways and mass transit for 1998 through 2003 are based on the Transportation Equity Act for the 21st Century. Spending levels for all other categories during that period are based on the President's 1999 budget.

a. Includes capital outlays for all types of infrastructure.