TECHNICAL ASSISTANCE OF JICA ON ROAD & BRIDGE MAINTENANCE MANAGEMENT

Economic Infrastructure Department, JICA

Contents

1. Road/Bridge Maintenance Management in Japan

Statistics of Road in Japan

As of 2008

Classification of Roads	Actual Length (km)	Ratio of Pavement (%)	Road Density (km/1,000km^2)
Expressway Highway	7,431.20	100	20
National Highway (Specified Section)	22,591.60	100	60
National Highway (Non-specified Section *)	31,938.80	98.9	85
Provincial Road	129,328.90	96.3	342
City, Town and Village (CTV) Road	1,009,599.40	76.2	2,671
TOTAL	1,200,889.90	79.6	3,178

Source: Annual Road Statistics in Japan, 2008

*: Not administrated by Ministry of Land Infrastructure and Transport, but by Provincial Government

Statistics of Bridge in Japan

As of 2008

Classification of Roads	Number of Bridges (Length less than 15m excluded)	Number of Bridges (Length Exceeding 50m)
Expressway Highway	6,614	3,028
National Highway	11,368	3,464
National Highway (Non-specified Section)	12,899	2,285
Provincial Road	32,981	5,096
CTV Road	88,098	4,539
TOTAL	151,960	18,412

Source: Annual Road Statistics in Japan, 2008

Operational Cost and Maintenance

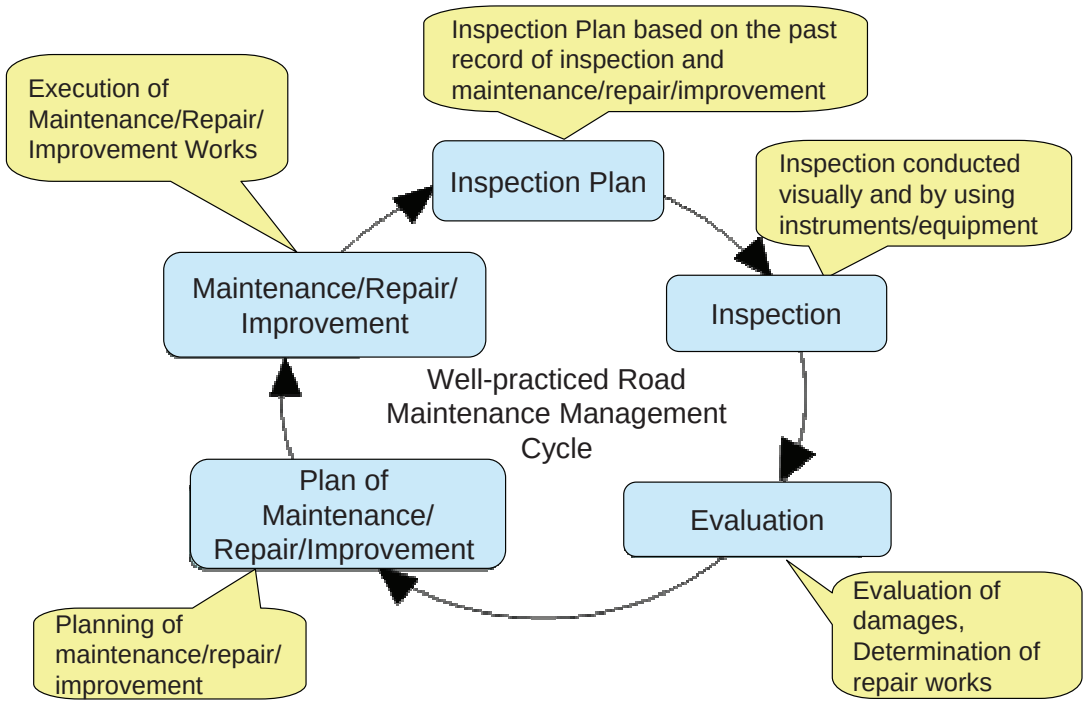
As of 2008

Classification of Roads	Operating Cost (A) (Thousand Yen)	Maintenance Cost (B) (Thousand Yen) *1	A/B (Percent)	Maintenance Cost per Kilometer (US$/km)*2
Expressway Highway	189,178,627	-	-	-
National Highway (Specified section)	2,022,652,239	425,343,098	21.0	187,140
National Highway (Non-specified section)	644,367,420	116,900,222	18.1	36,381
Provincial Road	1,984,634,266	302,022,464	15.2	23,212
CTV Road	2,215,232,091	423,427,916	19.1	4,169
TOTAL	7,056,064,643	1,267,693,700	18.0	10,493

*1：Maintenance cost is the sum of maintenance and repair works on Bridge and Pavement
*2：US$1.0＝¥100.6066（As of 1 April 2008）

Source: Annual Road Statistics in Japan, 2008

Well-practiced Road/Bridge Maintenance Management Cycle



Maintenance/Repair/ Improvement （Example of JAPAN）

- Maintenance

Surface Repairing

Cleaning

- Repair

Reconstruction of Pavement

Replacement of Expansion Joint

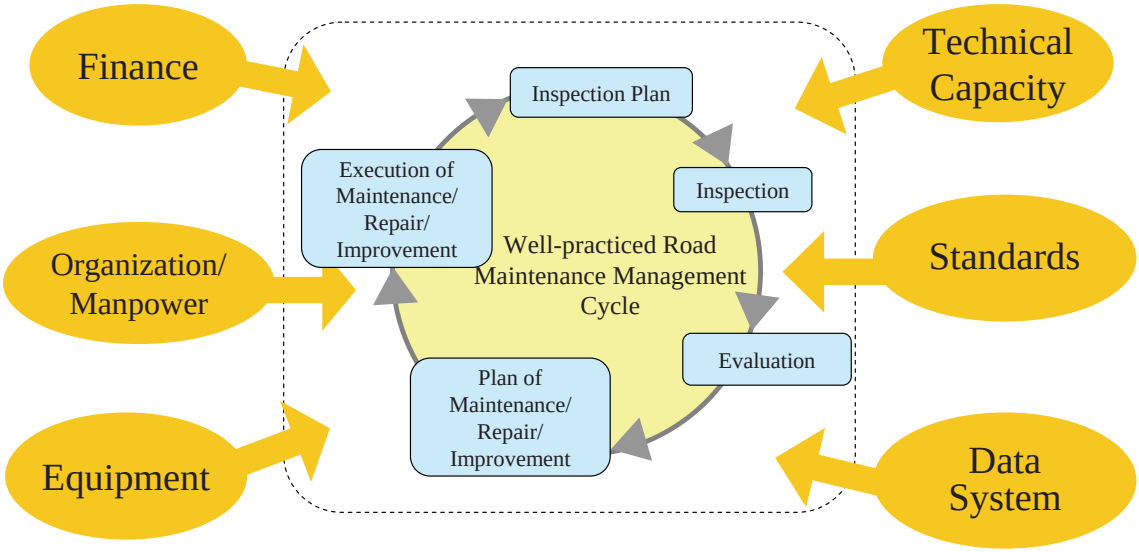
- Improvement

Improvement of Pavement

Seismic Reinforcement

Roads/Bridges Maintenance Cycle

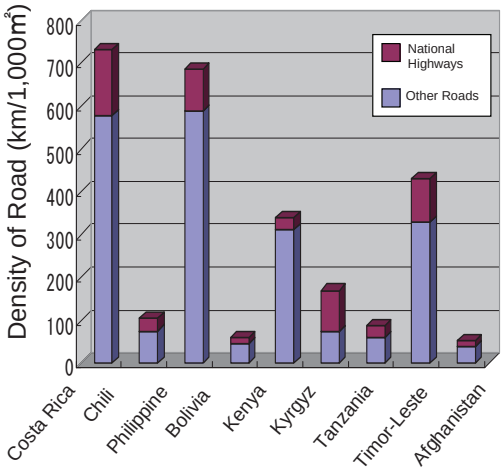
• In order to Implement a well-practiced Maintenance cycle



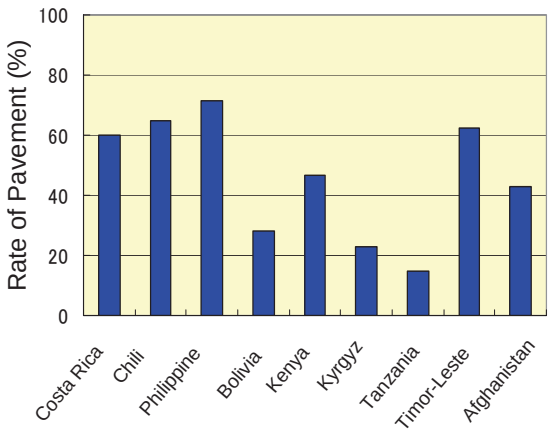
2. Situation of Recipient Countries

～Extracted from 9 Countries JICA Provided Technical Assistance to～

Road Condition of Recipient Countries

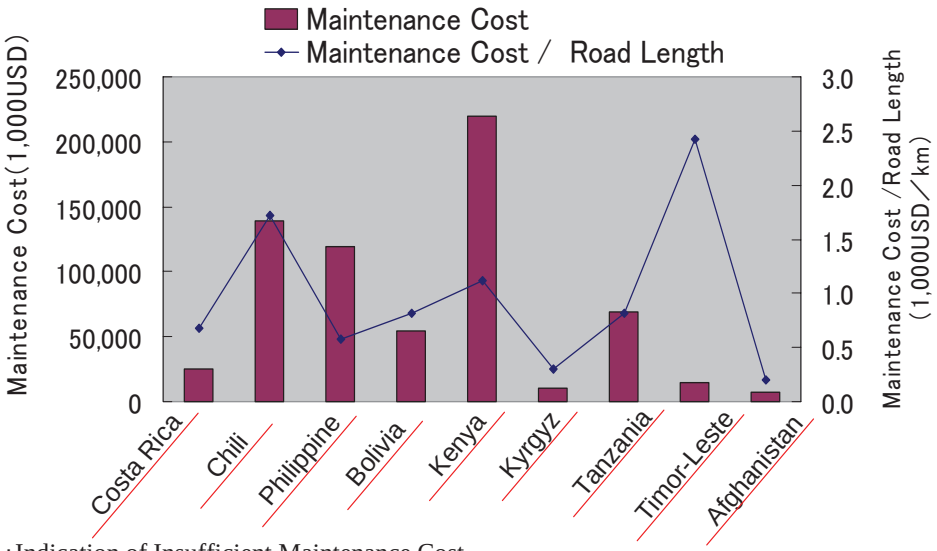


Road Density in Japan (2008)
Nationwide: 3,178km/1,000m2
National Road: 145km/1,000m2



Rate of Pavement in Japan (2008)
National Road: 100%

Maintenance Cost of Recipient Countries



1) —: Indication of Insufficient Maintenance Cost
2) In Tanzania, in FY2007/2008,there was an increase of 2.5 times in the road budget than the previous year and did not have problem of insufficient budget

Japan (2008)
National Road:187 (1,000 US$/km)
Municipal Road:4 (1,000 US$/km)

Maintenance Condition of Recipient Countries

- Results of Questionnaire from the Counterpart and JICA Advisor

	Organization/ Manpower	Technical Capacity	Standards	Data System	Equipment	Efficiency
Philippines	-	Lack	Complicated	Out-dated	Old	No
Kenya	Lack	Lack	Improper	Inventory	Yes	No
Tanzania	-	Lack	Improper	No	Lack	No
Costa Rica	Lack	Lack	Improper	Out-dated	Lack	No
Chili	Lack	Lack	Improper	Out-dated	-	No
Bolivia	-	Lack	Improper	Out-dated	Lack	No
Kyrgyz	Lack	Lack	No	Out-dated	-	No
Timor-Leste	Lack	Lack	No	Inventory	Lack	No
Afghanistan	Lack	Lack	Improper	No	Lack	No

Note - : Unconfirmed

Condition of Road/Bridge Maintenance Management of Recipient Countries

Points indicated for 9 countries extracted、

- Insufficient financial resources (All Countries)
- Insufficient technical capability (All Countries)
- Ill-functioned organization, lack of manpower (Many Countries)
- Existence of standards, but not utilized or unified (Many Countries)
- Existence of data or system, but out-dated (Many Countries)

Example of Low Technical Capacity

Deterioration of repaired pavement surface caused by the use of improper sub- grade material (Using uncrushed river gravel)

Damage (Crack) on Embankment due to improper compaction of fill material

Out-dated Data

- Example of road maintenance inventory (Kyrgyz Republic)
  - －Data of road damages are out-dated

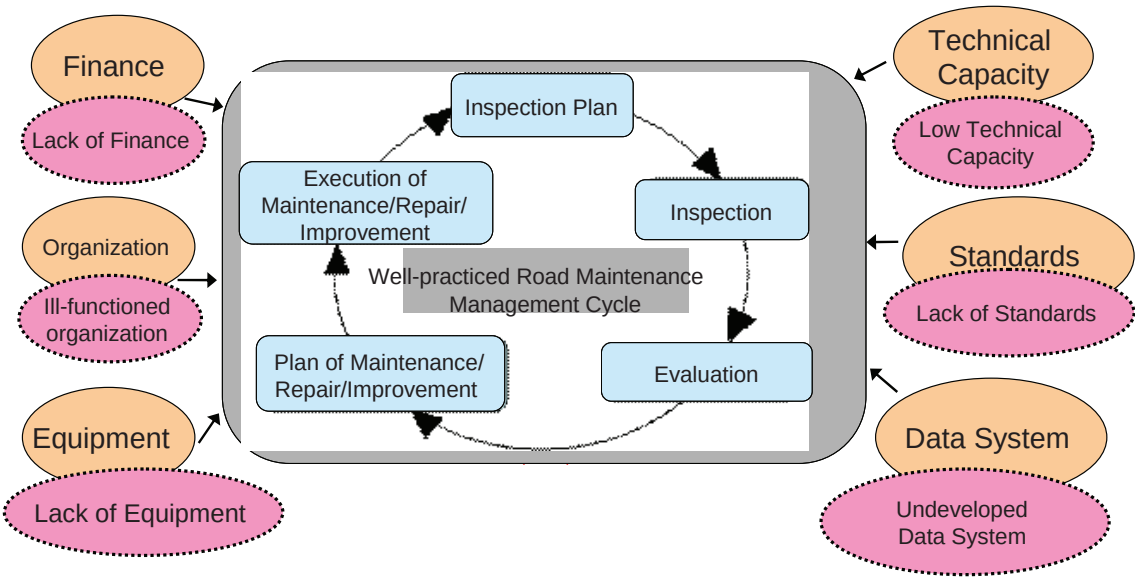
Example Of Aged/Old Equipment

In developing countries, equipment get prematurely aged/old due to improper and untimely maintenance mainly accounted for lack of maintenance technology and unavailability of spare parts.

Aged/old bull dozer left abandoned

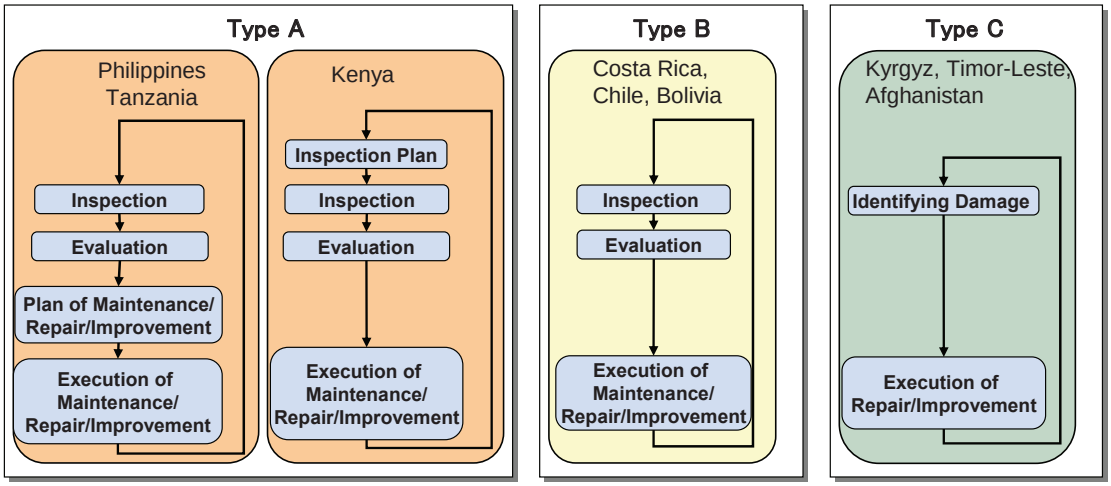
Aged/old road roller and bull dozer left abandoned

Condition of Management Cycle for Road Maintenance in Developing Countries



Types of Management Cycle In Developing Countries

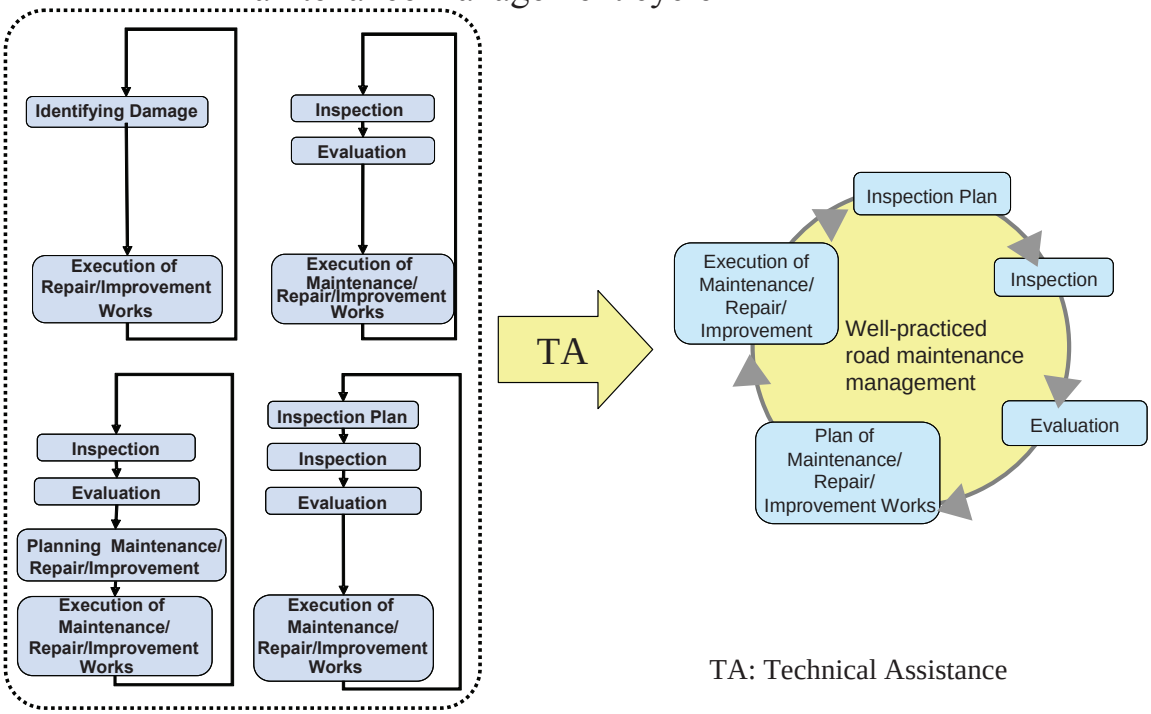
Type A	the management cycle consisting of a plan, inspection, evaluation, and execution of maintenance/ repair/improvement works.
Type B	the management cycle consisting of inspection, evaluation, maintenance/repair/improvement works but no planning.
Type C	The management without a proper cycle and maintenance/repair/improvement works executed only when damages identified.



3. Present Technical Assistance Provided by JICA on Road/Bridge Maintenance

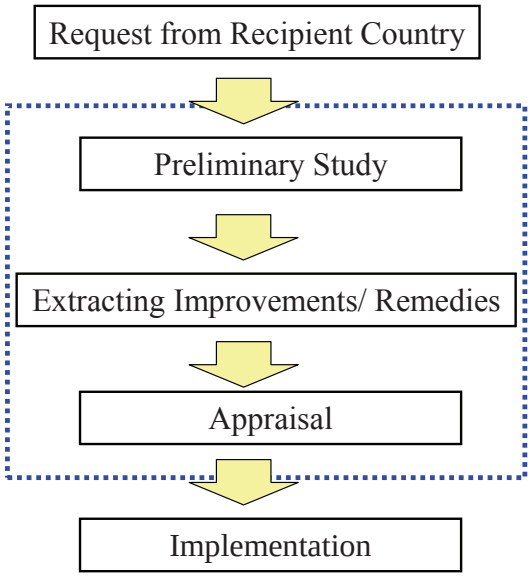
Technical Assistance Of JICA

- Target : Establishment of sustainable and well-practiced maintenance management cycle



TA: Technical Assistance

Procedures of Technical Assistance of JICA



- Implementation of technical assistance in accordance with the actual condition of the recipient country
- Implementation of technical assistance in a manner that is acceptable to the recipient country and does not demand major changes

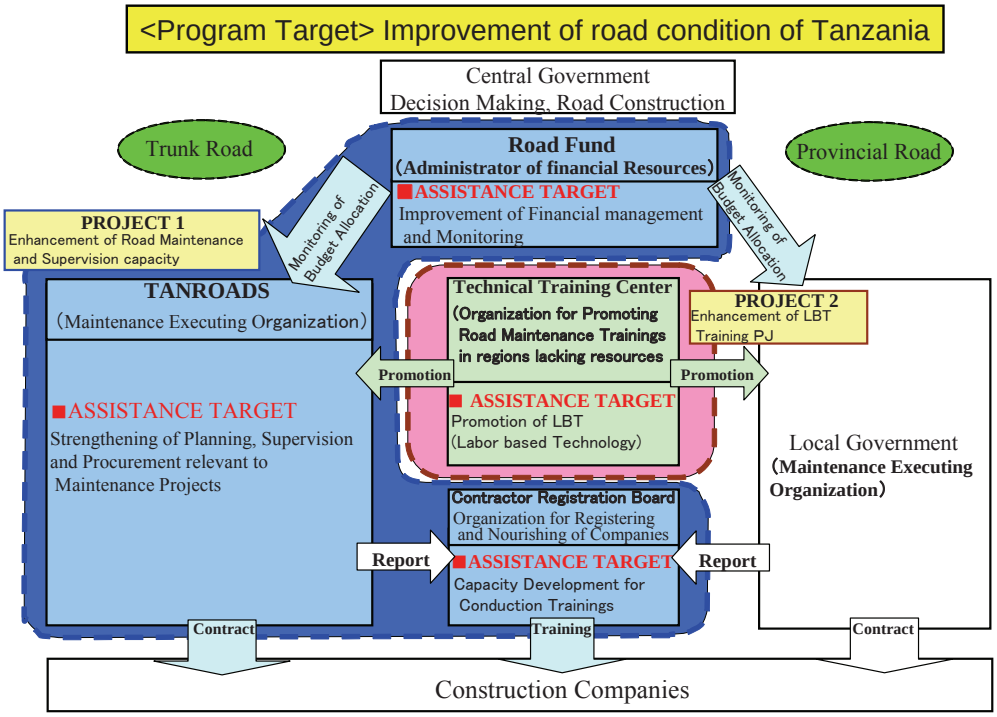
Characteristics of Present Technical Assistance of JICA

- Adherence, development of technical capability highlighted
- Establishment of organization, formulation of standards and data system that contributes in adherence, development of technical capability
- Low tendency regarding assistance on the establishment of organization, formulation of systems necessary for securing and expanding financial resources for maintenance management

Example of JICA's Technical Assistance (TANZANIA)

• Background :	Though Tanzania National Roads Agency was established in the year 2000, due to its lack of operation ability, deteriorated roads are left behind unattended
• Period :	February, 2004 to March, 2009 (5 years)
• Counterpart :	TANROADS, Roads Fund Board (RFB), Contractors Registration Board (CRB)
• Activities :	1) Formulation of standards successively for maintenance management 2) Capacity development of TANROADS as a Client 3) Capacity development of RFB on management and monitoring as well as improvement of supervision index 4) Capacity development of private companies through CRB

Example of JICA's Technical Assistance (TANZANIA)



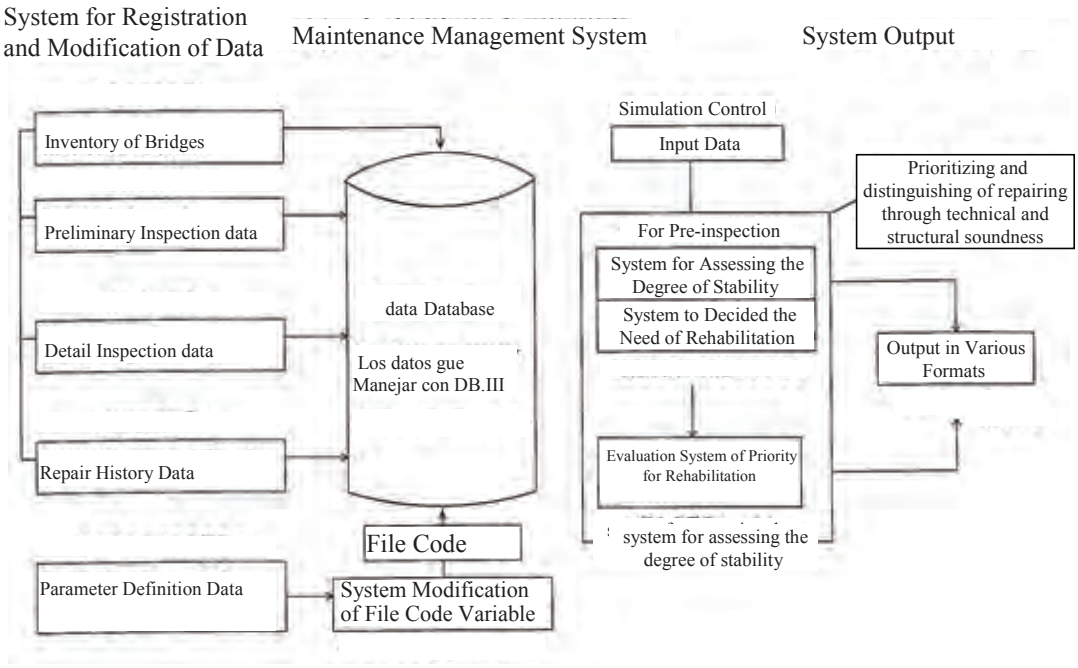
Example of JICA's Technical Assistance (CHILE)

- Background: Chile has problems of bridge maintenance management as there are many bridges damaged/corroded due to aging (constructed in the 30's), earthquakes and floods
- Period: January, 1991 to February1993 (2 years)
- Counterpart: Ministerio de Obras Publicas

- Activities: 1) Execution of inspection (256 bridges), damage evaluation and planning of repair/reinforcement
  2) Establishment of Bridge management system.

  Subsequently、
  It has been updating the data, and improving the system independently and is presently operating under self-reliance

Example of JICA's Technical Assistance (CHILE)



Example of JICA's Technical Assistance (BOLIVIA)

- Background: Every year during monsoon, disasters triggered by slope failures occur on topographically critical roads that cross over the Andes
  Period: October, 2005 to October, 2007 (2 years)
- Counterpart: Administradoda Boliviana de Carreteras
- Activities: 1) Planning of road disaster mitigation from the perspective of disaster preparedness and not from post-correspondence
  2) Establishment of disaster management office
  3) Capacity development of construction regarding disaster mitigation by means of pilot projects

● The assistance for rendering technical transfer/assistance based upon the disaster management plans mentioned above is scheduled from year 2009

Example of JICA's Technical Assistance (BOLIVIA)

- Technical transfer of disaster mitigation of slopes applying frame, through a pilot project

Before Construction

After Construction

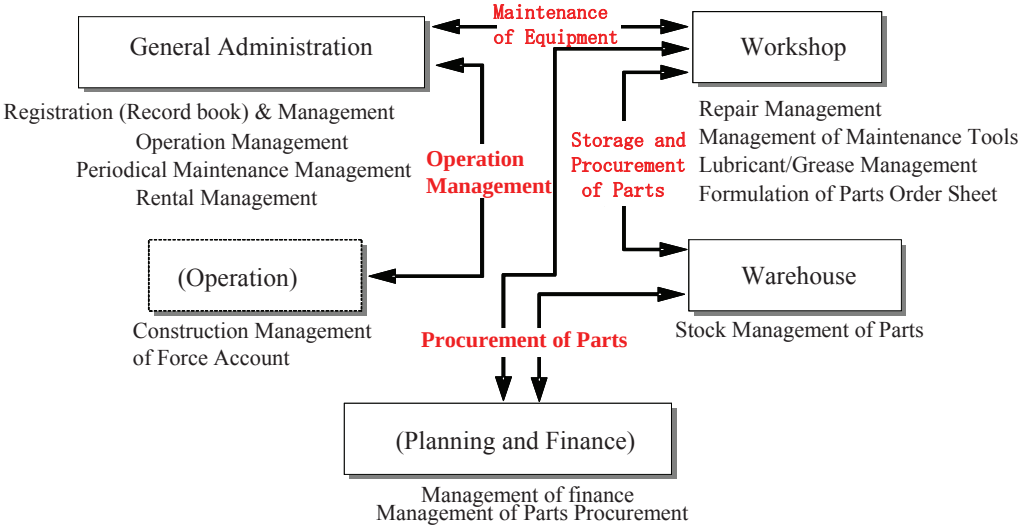
Example of JICA's Technical Assistance (TIMOR-LESTE)

- Background: The negative spiral caused by ill-practiced maintenance due to lack of financial resources, technical personnel, and defective system as well as many facilities requiring large-scaled maintenance resulted from untimely repair
- Period: June, 2005 to March, 2008 (3years)
- Counterpart: Ministry of Infrastructure
- Activities:
  1) Determination of standard for evaluation of inspection results and execution of inspection using the standard
  2) Capacity development of maintenance management planning for budget compilation
  3) Establishment of road equipment management system
  4) Establishing inventory data book for road maintenance management and installation of milestones

●The actual work for providing technical assistance is scheduled from 2009

Example of JICA's Technical Assistance (TIMOR-LESTE)

- Establishment of road equipment management system for effective and long-term use of equipment



4. Proposed Policy of JICA on Technical Assistance on Road/Bridge Maintenance

Proposed Policy on Technical Assistance of JICA

- Rendering technical assistance for securing financial resources and its effective use
- Proposing establishment or improvement of organization through the involvement of private companies
- Adherence/development of capacity ability through OJT or pilot projects
- Highly accurate identification of damages through sincere inspection and detailed investigation
- Assistance for strengthening the technical ability through outsourcing
- Applying existing standards prepared by JICA under its technical assistance
- Establishing a data system that enables easy and continuous updating
- Establishment of a computer-aided data system to fill up the shortage of manpower
- Procurement of equipment in accordance with the future plan such as outsourcing
- Enhancing efficiency of maintenance management considering life cycle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