Key Issues in Life Cycle Planning of Chinese Transportation Asset Management

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Transportation Fixed Asset Investment

More than 12.5 trillion;
The total transportation fixed asset investment in the 12th Five-Year was 1.6 times as the total investment in the 11th Five-Year.

Railway

3500 billion;
The total mileage of railway operation was 774,565.

Highway

The total traffic mileage was 2.84 million; the expressway network “7918” has been basically built.

Water Transportation

Increased 500 ten-thousand-tons class berths in five years;
More than 2100 ten-thousand-tons class berths.

Air Transportation

Increased 39 civil airports in five years;
214 civil airports;
Traffic Infrastructure Construction Investment between January to April, 2016

- Railway + Highway + Water Transportation
  - 12.39 billion tons
  - ▲ 2.5%

- Highway Construction Investment
  - 347.2 billion
  - ▲ 8%

- Water Transportation Construction Investment
  - 30.4 billion
  - ▲ 13.9%
Challenges

Many transportation asset classes: highway, railway, air transportation; infrastructures, vehicles, device, buildings……

Transportation assets are widely distributed; density of assets in southeast region is higher than in northwest region.

Transportation assets change frequently.

Funds allocation for different transportation projects.
KEY TECHNOLOGIES

- Storage technology of big data
- Remote monitor technology of highway and transportation asset
- High-tech detection of highway and transportation asset
- Maintenance and reinforcement technology with high proficiency
- Self-healing technology of infrastructure

RESEARCH FOCUS

Allocation problem of asset management funds

- Trade-off analysis, Pareto genetic algorithm
- Resource allocation, program decision based on risk analysis

Data integration technologies

Influence of time-cost on the total costs of asset management
Highway Asset Management System
Asset Management System

Database System

Detection and Evaluation System

Maintenance Decision Analysis System

Bridge Asset Management System

Statistical Analysis Management System
Asset Management System

- Database System
- Detection and Evaluation System
- Maintenance Decision Analysis System
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Present Situation
Asset Management System

**Database System**

**Detection and Evaluation System**

**Maintenance Decision Analysis System**

**Bridge Asset Management System**

**Statistical Analysis Management System**
## Present Situation

### Asset Management System

- **Database System**
- **Detection and Evaluation System**
- **Maintenance Decision Analysis System**
- **Bridge Asset Management System**
- **Statistical Analysis Management System**

#### Analysis - Work list (Unconditional budget)

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<tr>
<th>Segments</th>
<th>Length (km)</th>
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<th>Financial Cost</th>
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| **2011**          |             |       |                             |                |
|                  | 0.12        | 5000.00 | Thin overlay               | 0.156600       |

| **2012**          |             |       |                             |                |
|                  | 0.22        | 5000.00 | Thin overlay               | 0.294300       |
|                  | 0.10        | 5000.00 | Thin overlay               | 0.133650       |

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PaveMaster

Integrated Design and Analysis Platform for Construction and Maintenance of Road Pavement
Key Issues

- Build a sustainable asset management system
- Communicate
- Monitor
- Build effective database
Sustainable transportation asset management system

- Activities relating to the assets, including operations, maintenance, asset renewals, new asset development work activities, performance monitoring, procurement and program delivered.
- Not focus on the asset management of a specific transportation program; for a long-term, transportation asset of highway network should be analyzed.
- Not only inner relation in this system, but also the relation of transportation asset with environment, economy……
Communicate

- Leadership, linking strategy and action in transportation asset
- Ministry of transport – Provincial department of transportation- specific agencies, about missions, goals, program initiatives, services and products.
- Engineering units, divisions and offices
- Governors, technicist, constructors
Monitor & Build effective database

- Effective monitor devices
- Consistent and accurate data collection
- Lack of integration between many of the systems pertaining to core processes
- Large numbers of specific data throughout the life of transportation asset-BIG DATA

Video monitor (Zhongwei dianzi, Hangzhou)

Electronic monitor and control (Jinsui zidonghua, Chengdu)

Emergency broadcast and phone (Gongkefeida, Beijing)

Traffic event detection (Daotantan, Guizhou)

Tunnel lighting monitor and control (Shenghui lighting, Jiaxing)
THANK YOU!

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