PROJECT INFORMATION DOCUMENT (PID)
CONCEPT STAGE

Report No.: PIDC25278

Project Name	Anhui Road Maintenance Innovation and Demonstration Project (P153173)
Region	EAST ASIA AND PACIFIC
Country	China
Sector(s)	Rural and Inter-Urban Roads and Highways (70%), Information technology (15%), Sub-national government administration (15%)
Theme(s)	Other public sector governance (100%)
Lending Instrument	Investment Project Financing
Project ID	P153173
Borrower(s)	People's Republic of China
Implementing Agency	Anhui Provincial Transport Department
Environmental Category	B-Partial Assessment
Date PID Prepared/ Updated	25-Jun-2015
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Concept Review Decision	Track II - The review did authorize the preparation to continue

I. Introduction and Context

Country Context

China has achieved remarkable economic growth in the past three decades and lifted more than 600 million people out of poverty. However, the growth has not been spread evenly throughout the country. Over 170 million people still live below the US$1.25 per day international poverty line, and there are growing disparities between the more prosperous east/coastal regions and the west and central provinces. Income per capita in the west and central provinces is less than half of those found in some coastal provinces.

Anhui has, when compared to its neighbors to the east (Zhejiang and Jiangsu), not been an equal beneficiary in the growth of the last three decades. Anhui has lagged prominently behind in economic development. Anhui’s Gross Domestic Product (GDP) reached RMB 34,575 per capita in 2014, which was only 75 percent of the national average (RMB 46,652 per capita), ranking 26th in the country, and less than half the level of more prosperous Zhejiang and Jiangsu provinces.

China's 12th Five-Year Plan (12th FYP, 2011-2015) aims for a new growth pattern, which is more balanced and more equitable, in order to reduce development disparities between regions, rural and urban areas, and big cities and small towns. Currently, China's policy makers are finalizing the details of the 13th Five-Year Plan for the period from 2016 to 2020, and with the view of adopting the final text in March 2016.

Sectoral and Institutional Context

The proposed project is being developed in the context of China's renewed focus on maintenance of the highway assets created during the last 20 years. Ministry of Transport (MoT) has recognized that highway maintenance has lagged behind highway construction and is now encouraging provincial Departments of Transport (DoTs) to focus their financing and organizational resources toward maintaining the road network.

China currently has the second largest road network and the longest expressway network in the world. China's highway network has expanded vastly since economic reforms begun in 1978, increasing from about 900,000 km in 1981 to 4.3 million km in 2013. According to the MoT, China's highway construction growth rate will peak in 2015, where the network will reach about 4.5 million km; hence expansion will be mostly limited to completing missing links and extending the network to less developed regions in the western and central part of China.

The decentralized institutional and financing framework of the country contributed to the rapid expansion of highways. In contrast, road maintenance in China has been underfunded and is carried out under a poor institutional structure, with little private sector participation and a weak performance culture. While the well-developed construction industry in China, which includes large private construction companies, is involved in highway construction, road maintenance is exposed to challenges such as: lack of scientific basis for asset maintenance planning and programming; little modernization; lack of a performance culture and accountability for results; and budgetary allocations for maintenance well below the required level.

Many provinces in China have implemented the China Pavement Management System (CPMS), a Chinese version of an asset management system, built around international practices, which is offering several modules relevant to the management of roads and bridges. However, in several provinces, including Anhui, implementation has not been successful due to: (i) lack of staff capacity; (ii) weak integration with other management systems; (iii) lack of budgets to maintain and upgrade the software; and most critically (iv) lack of business reforms to procedures and processes needed to adopt the CPMS outputs in decision-making. Maintenance decisions in many provinces are thus still based on basic reactive approaches, where needs are determined by manual surveys.

The private sector (which includes State Owned Enterprises) is not involved in road maintenance planning or programming for highways and provincial roads, but does deliver medium and major maintenance works through traditional output based contracting methods. Minor works are most often delivered through in-house force account approaches. While involvement of the private sector in programming has been piloted on a small scale, for instance through performance based contracting of minor works to contractors or to micro-enterprises, this has not yet been adopted on a larger scale.

Anhui highway sector

The highway network of Anhui province has more than doubled over the last eight years, from about 71,214 km in 2006 to about 173,763 km by the end of 2013. While many of the new roads are rural roads, the expansion was also the result of Anhui Provincial Government undertaking upgrading and reconstruction of the existing national and provincial trunk highway network in the 11th FYP and 12th FYPs. Of the total network, national and provincial trunk roads comprise 9,495 km; these are the focus of this project.

In 2014 over 6,800 km of national and provincial highways were inspected and evaluated for maintenance. The survey showed that 76% of the roads have a Pavement Quality Index (PQI) of 80 or higher (good or better condition), leaving 24% of the network in poor or bad condition. This places Anhui below the average for China. As the survey was conducted only on the main corridors, the picture for the whole network may be worse.

Currently highway maintenance development in Anhui province is guided by the prevailing national 12th FYP for transport development. The objectives of Highway Maintenance and Management Development under the 12th FYP include: (i) development of a scientific decision-making system for maintenance management; (ii) improvement of maintenance technologies; (iii) enhancement of network operation monitoring; and (iv) improvement of emergency response capacity. Maintenance projects in Anhui include minor, medium, and major works of national and provincial highways, bridge reconstruction, safety protection projects, disaster prevention projects, emergency projects, and restoration projects.

Anhui province implemented a decentralization reform where responsibilities are transferred from central to decentralized levels. Anhui Highway Administration Bureau (AHAB) is responsible for the regulation and guidance of national and provincial trunk highway maintenance, while the transportation authorities of municipalities are responsible for the maintenance and supervision of trunk highways, as well as fundraising to supplement the subsidies provided by provincial governments.

Currently major and medium maintenance programs in Anhui are prepared based on (manual) annual surveys carried out by each municipality. Once sections have been identified to be included in the program, an external design institute designs the maintenance interventions to be applied and the works are tendered to the private sector. While the design is based on the condition data, some additional surveys, including measurement of structural capacity using Benkelman beam testing, may be applied, though this is decided on a case by case basis. Parallel to the annual manual data collection by the municipalities, the province commissions an equipment based survey (the main network is covered in a two year cycle), which is fed into the CPMS and the output is submitted to the municipalities. However, this output is not used in the maintenance programming.

While medium and major maintenance on a project basis is contracted to the private sector using traditional output based contracting modalities, minor maintenance works of trunk highways is carried out by in-house force account maintenance teams.

Maintenance budgets vary greatly from year to year and are far below estimated needs. Over the last five years the allocation for medium and major maintenance has varied between RMB 580 Million (in 2012) to RMB 2.04 Billion (in 2014); over the last three years there has been an increasing trend. The allocation for minor maintenance has however been more stable at about RMB 1.3

Billion a year. The Provincial Highway Bureau estimates the total needs for medium and major maintenance to be about RMB 4 Billion, double of past allocations. There is also a finance gap for minor works maintenance, though a value is not known, and local authorities sometimes assist with own funds to close or minimize the gap.

As part of the decentralization reform, municipalities and counties are responsible for a significant share of road maintenance costs. The Anhui provincial finance department provides subsidies (derived from the central and provincial governments) to municipalities for medium and major repairs. These subsidies are allocated (earmarked) on a per km basis for specific projects at rates of RMB 0.6-1.0 million/km depending on road class. Municipalities and counties are responsible for providing the remaining maintenance expenses, which are generally raised from vehicle purchase fees, tolls, and from general fiscal revenues.

Challenges

As in many other provinces in China, focus on maintenance in Anhui is recent, and the capacity for road maintenance is much lower than for road development. There are weaknesses in most of the asset management related capabilities, e.g., funding, systems, governance and maintenance delivery. While funding has increased over the last three years, it is still far below estimated needs, resulting in large portions of the network being in poor or bad condition.

The decentralization reform has resulted in some uncertainties about roles, accountability and coordination between the different stakeholders, and has also pushed road asset management to administrative levels that are less developed compared to the provincial levels, which were formerly undertaking these obligations. As a result, road asset management is experiencing poor planning and design.

While CPMS is in place in most of the municipalities and data for the main roads are collected on a two-year cycle, the CPMS system output is not used in decision-making and business processes have not been reformed to take advantage of the capabilities linked to the CPMS. Decisions are still based on the manual data collected by municipalities and counties. Where the CPMS system is operational, the CPMS output is used as a comparison to the reactive approach.

It is reported that medium and major works are delivered effectively, however the data used for their design is very basic. Moreover quality problems have been reported. Minor maintenance is applied with low efficiency, an issue which the road authorities find difficult to improve given that work is done in-house, the work force is aging, and there are constraints in hiring replacements to retiring staff.

National regulations require provinces to maintain maintenance emergency capabilities. The centers in Anhui are outdated (aging equipment), understaffed, and lack skilled personnel, leading to road closures longer than necessary during emergencies.

Based on these issues and challenges, Anhui Province has proposed a project focusing on improving road management capacity at lower levels of administration and on improving maintenance delivery through maintenance marketization, adoption of new preventive maintenance technologies, and better emergency response capabilities.

Lessons from other World Bank transport projects in Anhui

Anhui Province is an experienced client of the World Bank, and has successfully implemented several World Bank projects. The most recent project in the sector in Anhui, the Anhui Highway Rehabilitation and Improvement Project (P099112, completed in June 2012), supported increase in the effective use of the road infrastructure through rehabilitation of about 890 km of the road network, improvements or upgrading of about 320 km of provincial and national roads, implementation of performance based maintenance on two short highway segments, and implementation of an institutional strengthening program.

The project introduced a range of pavement recycling technologies, of which cold recycling proved to be cost-effective and hence since been adopted in the Anhui maintenance portfolio. This experience with piloting and adopting new maintenance technologies will also be adopted in this new operation, focusing on testing preventive technologies.

The former project also piloted performance based contracting on two 60 km sections for minor works with contract durations of two years. The pilot demonstrated that the contract duration should be considerably longer (at least four years) and that the work volume should be larger to achieve scale effects. As in other provinces, this pilot also faced institutional barriers which hampered implementation, including: (i) difficulties in accepting the new division of roles between the road authority and contractors; and (ii) fear of job losses among blue collar in-house staff.

Taking into account these lessons, the new operation will focus on developing packages that are attractive for the private sector. The current shortage of blue collar in-house staff is expected to reduce fears of job loss. With Anhui having gained experience in piloting different roles for the road authority and the contractor compared to more traditional approaches, the environment for implementing the performance based contracting approach under the proposed project is expected to be much better.

In addition, based on an evaluation of the implementation of CPMS, the proposed new operation will empathize the reforms needed for embedding the CPMS system output in the decision-making processes.

Relationship to CAS

Country Partnership Strategy. The proposed project supports Strategic Theme 2 of the 2013-2016 World Bank Group Partnership Strategy for China, “promote more inclusive development”, by lowering vehicle operating costs for more balanced regional development, improving maintenance emergency response, and for a better quality of life.

Twin Goals. The proposed project supports the World Bank’s Twin Goals of ending extreme poverty and boosting shared prosperity. The pilot municipalities and one county identified for the proposed project had about 2.28 million rural population (about 18% of the total 12.75 million rural population in pilot municipalities and county) living in poverty in 2013 (below the US$ 1.25 per day international poverty line). Most of the poor live in rural areas and depend on transportation for their employment and business, as do local vulnerable groups, e.g., older people, who constitute about 19% of the total urban and rural population in the five municipalities and county. Improved road conditions and the new emergency centers built under this project will bring shared prosperity by

connecting both rural and urban poor to better employment and business outcomes, improving access to education, health services and social protection programs, and attracting more investors. In addition, the project will help better manage trunk highways and contribute to the overall economic development of Anhui province. Socioeconomic surveys and analysis would be carried out during project preparation to flesh out the expected contributions of the project to the Twin Goals.

II. Proposed Development Objective(s)

Proposed Development Objective(s) (From PCN)

The Project Development Objective (PDO) is to improve road highway asset management capacity and road service delivery in the participating municipalities and county in Anhui Province.

Key Results (From PCN)

The achievement of the PDO will be measured through the following proposed project outcome indicators:

a) Percentage of roads in good or fair condition measured by MQI (measures delivery)
b) An indicator to measure innovative preventive maintenance technology (to be determined prior to project appraisal)
c) Time to respond to emergency events (measures delivery)
d) Percentage of major and minor maintenance funds allocated based on the recommendations of the asset management system (measures capacity)

Indicator a) is a Bank core indicator. During project preparation additional indicators will be considered and developed, including indicators linked to the adoption of the piloted technologies in decision-making and delivery, as well as for citizen engagement.

As not all roads in the municipalities and county will be included in the project, it is envisaged that an impact analysis will be carried out at the time of project completion to compare the outputs of the project's innovative features with 'business-as-usual'.

III. Preliminary Description

Concept Description

The project is designed to address some of the principal challenges of road asset management in Anhui. The main focus of the project will be on supporting: (i) better network knowledge (data), improved capacity for analysis (systems), and their adoption for better decision-making through reforms; (ii) better value-for-money of maintenance allocations through new maintenance technologies focusing on preventive maintenance and new contracting models to increase efficiency through the involvement of the private sector; and (iii) better response to emergencies, which affect road usage. The project will hence focus on improvements in maintenance planning as well as on delivery.

The project will introduce two new features in road maintenance in Anhui: (i) full scale PBC through private sector participation; and (ii) preventive maintenance techniques currently not used in Anhui. The project will also serve as a demonstration for these innovations, which if successful, can be replicated in other provinces.

Anhui has proposed that five pilot municipalities and one county will participate in the project

(Hefei, Chuzhou, Suzhou, Anqing and Xuancheng Municipalities, and Guangde County). The pilot municipalities and county have been selected by Anhui Province based on criteria discussed with the Bank, and represent a geographic spread, socio-economic development levels, levels of poverty, road network conditions and road maintenance financing levels. These selections will be reviewed during project preparation, taking into account, inter alia, implementation capacity, fiscal capacity and the suitability of the road networks.

In support of the achievement of the PDO and to support Anhui's highway maintenance development plan, the proposed project will comprise the following components.

Component A – Road Asset Management System Upgrade. In response to the need for better and more efficient road asset management, this component will provide technical assistance, equipment, and software for the integration, optimization, and upgrade of the current road asset management information systems of Anhui, as well as introduction of relevant new modules and systems, e.g. condition monitoring on roads, bridges and tunnels; analysis of needs for maintenance and rehabilitation; prioritization of needs under budget constraints; and maintenance cost accounting.

Understanding that the developed and implemented technologies will only make an impact if institutionalized and embedded into the actual decision-making processes, this component will also include the necessary activities to reform and enhance business processes to make full use of the asset management technologies. Project preparation will include analysis of and decisions regarding sustainable funding mechanisms and approaches to data collection (e.g., data collation in-house or keep it outsourced as today), systems operation and management (e.g. system upgrades and software licenses) as well as maintaining needed capabilities (e.g. replacement training). Taking into account the current implemented decentralized structure, the reforms will address revised roles and responsibilities as well as the re-engineered business processes, where system outputs will be used in decision-making. It will also examine opportunities to enhance the benefits of having up-to-date data and improved analytical capabilities in information dissemination, for instance through annual reports.

Component B – Road Maintenance Marketization. In response to the needs for restructuring the organization of maintenance and rehabilitation works in the sector, this component will provide financing for civil works under the marketization of road maintenance and rehabilitation for about 1,100 km of roads for minor, medium and major works. It is a PCN stage estimate that medium and major works would amount to about 800 km of national and provincial roads over the contract period.

Minor maintenance includes routine maintenance (pavement surface cleaning, snow cleaning, grass cutting, drainage cleaning, slope erosion protection, pothole patching etc.) and patching of smaller areas. Medium maintenance includes renewal of pavement surface by overlaying or by replacing the existing wearing course. Major maintenance includes pavement reconstruction or rehabilitation. The project is not expected to include new roads, nor road widening.

The private sector is expected to be a key driver in this restructuring, with enhanced private sector involvement in asset management (primarily in maintenance programming and application), and will be the vehicle for achieving improved efficiency and secure sustainable funding levels.

Marketization will be implemented through PBC to the private sector where the contract holders

will be required to plan and fund their work to meet defined road standards, and will be paid in installments linked to meeting these service standards. Contract periods are envisaged to be between 3 to 10 years, and that about 200 km of roads will be packaged into each contract package, using Output and Performance Based Contracts (OPRC) types of private engagements.

Based on lessons learned from the previous project, this component will need to be carefully designed to: (i) offer work packages that will be of interest to private firms, as well as (ii) address internal resistance to marketization, especially resistance linked to staff losing their current jobs.

The key for developing attractive work packages includes a suitable combination of roads (condition and length) and work types and contract length (which will support efficient use of the contractor's equipment and staff). Works packages will thus include a range of maintenance activities (minor, medium, and major works) and the contract duration will be suitable for efficient deployment of the contractor's equipment and staff. During project preparation the Anhui Province, with assistance from the Bank, will reach out to the industry to get a better feel for their preferences.

Anhui has indicated that staff affected by the marketization will either be relocated to other road sections currently in need of staff or will be reassigned to the emergency centers to be established under the Project. This is expected to significantly reduce the likely internal resistance. The possibility of transferring current in-house staff to the contractors under certain conditions and obligations may also be considered during project preparation. Finally the project timing will benefit from being aligned with the Five Year Plan cycle (the 13th FYP will cover 2016-2020); this will make it easier to handle multi-year contracts, especially if the 5 year contract option is selected.

A key feature of the design of this component is to bring international experience to Anhui and modify it to the specific context of China in general, and Anhui in particular.

Component C – Innovative Preventive Maintenance Technology. This component will finance the application of innovative preventive maintenance technologies on about 640 km of national and provincial roads (not the road sections under PBC). Technologies envisaged include pavement surface recycling, micro-surfacing, and slurry seal. Technologies to be applied will be analyzed during project preparation, and will take into account technologies already applied elsewhere in China as well as new external technologies relevant to the road types and climate in Anhui. This component will also include the manuals and technical specifications needed to support the application of the new technologies into the maintenance works portfolio.

Component D – Establishment of New Road Emergency Response System. This component will finance the development of maintenance emergency response centers (both upgrading of current facilities and new construction) in the participating municipalities/county (one in each), and equip the centers with advanced maintenance emergency response facilities and equipment. The centers will provide storage for equipment, and will include a maintenance workshop and office space. Emergency response capabilities are part of national regulations, and this component will pilot improvements towards meeting these regulations. The component will also strengthen the institutional system of operation, in order to fully benefit from improved capacity and will look into possibilities of enhancing Disaster Risk Management (DRM).

Component E – Institutional Capacity Building. This component will finance strategic studies and technical assistance (including international technical assistance) activities aimed at improving local

capacities for planning and operating and maintaining road assets in Anhui. It will also support international and domestic study tours for relevant staff as well as relevant training. It is envisaged that study tours will focus on international and domestic best practice in asset management systems, asset evaluation, financial management, maintenance contracting, and maintenance technologies. Activities, including possible support to Project Management, and studies under this component will be developed during project preparation.

Project Costs and Financing

The total project cost is estimated at RMB 2.28 billion (US$ 380 million) of which US$ 150 million will be financed by the proposed IBRD loan and the remaining US$ 230 million will come from counterpart funds. Component A is currently budgeted at RMB 6 million (US$ 1 million of which US$ 800,000 is proposed as IBRD loan); Component B and C are together budgeted at RMB 2.20 billion (US$ 366 million, of which US$ 140 Million is proposed from IBRD); Component D is estimated at RMB 75.7 million (US$ 12.6 million of which US$ 8.3 million is proposed from IBRD); and Component E is estimated at RMB 3 million (US$500,000, all proposed from IBRD). The distribution of project costs and loan allocation within the overall ceiling will be determined during project preparation.

The IBRD loan will be on-lent to the participating municipalities and county. The governments of these participating municipalities and county will be responsible for debt service and for counterpart funding. In the view of the New Budget Law that limits local governments' ability to borrow from commercial banks and use the proceeds to finance a large part of their counterpart obligations, Anhui provincial government plans to continue to use provincial fiscal subsidy to assist in covering project counterpart funds for major and medium maintenance at current rates (between RMB 0.6 to 1.0 million, depending on road class). The remaining counterpart funds will need to be provided by the participating municipalities and county.

IV. Safeguard Policies that might apply

Safeguard Policies Triggered by the Project	Yes	No	TBD
Environmental Assessment OP/BP 4.01	×		
Natural Habitats OP/BP 4.04		×	
Forests OP/BP 4.36		×	
Pest Management OP 4.09		×	
Physical Cultural Resources OP/BP 4.11		×	
Indigenous Peoples OP/BP 4.10			×
Involuntary Resettlement OP/BP 4.12	×		
Safety of Dams OP/BP 4.37		×	
Projects on International Waterways OP/BP 7.50		×	
Projects in Disputed Areas OP/BP 7.60		×	

V. Financing (in USD Million)

Total Project Cost:	380.00	Total Bank Financing:	150.00
Financing Gap:	0.00		

Financing Source	Amount
Borrower	230.00
International Bank for Reconstruction and Development	150.00
Total	380.00

VI. Contact point

World Bank

Contact: Jens Christian Helbech Hede
Title: Sr Transport. Spec.
Tel: 458-7148
Email: jhede@worldbank.org

Borrower/Client/Recipient

Name: People's Republic of China
Contact: Mr. Peng Xiang
Title: Deputy Director
Tel: 861068552074
Email: pengxiang@mof.gov.cn

Implementing Agencies

Name: Anhui Provincial Transport Department
Contact: Mr. Jie Luo
Title: Director
Tel: 8613805696789
Email: apcdpeo@vip.163.com

VII. For more information contact:

The InfoShop
The World Bank
1818 H Street, NW
Washington, D.C. 20433
Telephone: (202) 458-4500
Fax: (202) 522-1500
Web: http://www.worldbank.org/infoshop

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