

# Internal Ex-Post Evaluation for Technical Cooperation Project and Grant-Aid Project combined

conducted by Democratic Republic of Congo Office: February 2020

Country Name	Technical Cooperation Project (TC): <b>Project on Capacity Development for Bridge Management</b>
Democratic Republic of the Congo	Grant-Aid Project (GA): <b>Project of Improvement of the Marshal Bridge in Matadi</b>

## I. Project Outline

Background	<p>The Matadi Bridge, a suspension bridge constructed with Japanese ODA loan “Projet de Renforcement de la capacité de transport entre Banana et Matadi” in 1983, is the only bridge over the Congo River. Located in the city of Matadi, which is on the main route connecting the capital Kinshasa and Boma-Banana (in outer bay) and has Matadi Port, the country’s largest port, the Matadi Bridge had played an important role in social and economic development of the Democratic Republic of the Congo (DRC). Being 30 years after construction in 2013, fundamental inspection and maintenance of the bridge became necessary. The maintenance of the Matadi Bridge had been carried out by Organisation pour l’Équipement de Banana-Kinshasa République Démocratique du Congo (OEBK) using the technology transferred at the construction of the bridge. Since there was no other suspension bridge in the DRC, there was not enough accumulation of maintenance technology. Also, many of the engineers at the time of construction had already retired and it was urgently necessary to foster young engineers. This technical cooperation (TC) project was implemented to address such issues.</p> <p>Meantime, corrosion of main cables of suspension bridges was an issue around the world, and the dry air injection system was being introduced as a countermeasure. On the Matadi Bridge, too, an internal inspection of the cable conducted under the TC project found the progression of deterioration due to corrosion, which might cause disconnection of the main cable if left as it was. Therefore, the grant aid (GA) project was implemented to introduce the dry air injection system to the bridge.</p>
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### [TC Project]

Objectives of the Project	<p>Through the development of the medium-term bridge management and maintenance plan, updating of the maintenance manual and strengthening of the daily maintenance technique of OEBK technical personnel, the project aimed to reinforce the capacity of the OEBK in management and maintenance of the Matadi Bridge in the city of Matadi, thereby having the bridge maintained continuously and in good condition.</p> <ol style="list-style-type: none"> <li>Overall Goal: The Matadi Bridge is maintained continuously and remains in good condition.</li> <li>Project Purpose: The capacity of the OEBK in management and maintenance the Matadi Bridge is reinforced.</li> </ol>								
Activities of the Project	<ol style="list-style-type: none"> <li>Project Site: Matadi City, Kongo Central Province</li> <li>Main Activities: Survey (bridge soundness evaluation including internal inspection of cable), development of the Medium-term Bridge Management and Maintenance Plan (hereafter, “the Medium-term Plan,” updating of the existing maintenance manual, conduct training in inspection and repair techniques, etc.</li> <li>Inputs (to carry out above activities) <table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">Japanese Side</td> <td style="width: 50%;">DRC Side</td> </tr> <tr> <td>1) Experts: 3 persons</td> <td>1) Staff allocated: 123 persons</td> </tr> <tr> <td>2) Trainees received: 15 persons</td> <td>2) Office for short-term experts</td> </tr> <tr> <td>3) Equipment: inspection and repair equipment (high-place work benches, inspection trolleys, tower inspection elevators and elevator driving units, construction machinery such as rolling machine, etc.)</td> <td></td> </tr> </table> </li> </ol>	Japanese Side	DRC Side	1) Experts: 3 persons	1) Staff allocated: 123 persons	2) Trainees received: 15 persons	2) Office for short-term experts	3) Equipment: inspection and repair equipment (high-place work benches, inspection trolleys, tower inspection elevators and elevator driving units, construction machinery such as rolling machine, etc.)	
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Project Period	March 2012 – March 2015	Project Cost	(ex-ante) N.A., (actual) 323 million yen						
Implementing Agency	Organisation pour l’Équipement de Banana-Kinshasa République Démocratique du Congo (OEBK)								
Cooperation Agency in Japan	Honshu-Shikoku Bridge Expressway Company Limited; Oriental Consultants Co., Ltd.; IHI Infrastructure Systems Co., Ltd.								

### [GA Project]

Objectives of the Project	To delay the progression of corrosion of the main cable of the Matadi Bridge in the city of Matadi by introducing the dry air injection system and related works, thereby contributing to safe transportation and traffic through extension of the life of the bridge.			
Contents of the Project	<ol style="list-style-type: none"> <li>Project Site: Matadi City, Kongo Central Province</li> <li>Japanese side: Provision of grant necessary for: (1) Civil works and procurement of equipment (installation of the dry air injection system, retightening of cable band, caulking of cable, repainting of main cable, repairing of cracks in anchorage, and renewal of electrical equipment); and (2) Consulting services (detailed design and implementation supervision).</li> <li>DRC side: Renewal of the grid side of the power receiving facilities for the bridge and transformers.</li> </ol>			
Project Period	E/N Date	December 23, 2014	Completion Date	February 28, 2017 (Completion of the civil works)
	G/A Date	December 23, 2014		
Project Cost	E/N Grant Limit / G/A Grant Limit: 587 million yen		Actual Grant Amount: 587 million yen	

Executing Agency	Organisation pour l'Équipement de Banana-Kinshasa République démocratique du Congo (OEBK)
Contracted Agencies	Main Contractor(s): IHI Infrastructure Systems Co., Ltd. Main Consultant(s): Oriental Consultants Global Co., Ltd. and Nippon Engineering Consultants Co., Ltd. (JV)

## II. Result of the Evaluation

### < Special Perspectives Considered in the Ex-Post Evaluation >

- Evaluating Two Projects in One Evaluation. We evaluated the TC and GA projects together in the following way: for Relevance, evidence was confirmed for each project, based on which the two projects were evaluated as combined; for Effectiveness/Impact, the status of achievement of the project objectives was judged for each project using each whole set indicators mentioned in the terminal evaluation report (TC) (see the next paragraph below) and the ex-ante evaluation sheet (GA), based on which the two projects were evaluated as combined; for Efficiency, each project was evaluated, based on which the two projects were evaluated as combined; for Sustainability, the two projects were evaluated as combined.
- The TC Project's Project Design Matrix (PDM) and Indicators. For the TC project, the PDM (matrix that represents the project framework) was not prepared in the planning stage as the project was a small-scale technical cooperation project (with total planned inputs less than 200 million yen). The terminal evaluation team developed a "simplified PDM" for the purpose of evaluation. Then, the terminal evaluation team tentatively defined indicators for the Project Purpose and Overall Goal based on interviews with and consent of OEBK staff and Japanese experts. For this ex-post evaluation, since we found the contents of the "simplified PDM" are consistent with the master plan attached to the Record of Discussions (the basic agreement on the project plan), we used it as the planned project framework. Also, we used the indicators set by the terminal evaluation team for assessing the level of achievement of the Project Purpose and the Overall Goal.
- The GA Project's Qualitative Effects. The ex-ante evaluation sheet of the GA project described the qualitative effects of the project as the "contribution to safe transportation and traffic through extension of the life of the bridge." For the ex-post evaluation, we divided this statement in two items based on logic – we regarded the "extension of the life of the bridge" as the qualitative effects (subject of Effectiveness) and the "contribution to safe transportation and traffic" as the assumed impact (subject of Impact).

### 1 Relevance

#### <Consistency with the Development Policy of the DRC at the Time of Ex-Ante Evaluation and Project Completion (TC project) or Ex-post Evaluation (GA project)>

The TC project was consistent with the DRC's priority on infrastructure development both at the time of ex-ante evaluation and project completion as mentioned in the inaugural speeches of the fourth president Mr. Joseph Kabila Kabange in 2006 and 2011, the second Poverty Reduction Strategy and Growth Paper (PRGSP 2) (2011), and the five-year plan for state reconstruction (2012-2016).

The GA project was consistent with the development policy at the time of ex-ante evaluation, as mentioned above. At the time of ex-post evaluation, the project is consistent with the policies of both the national government (such as the National Strategic Development Program (PNSD) 2018-2022) and the local government (such as the five-year program of the new governor of Kongo Central Province 2019-2023), which emphasize transportation infrastructures.

#### <Consistency with the Development Needs of the DRC at the Time of Ex-Ante Evaluation and Project Completion (TC project) or Ex-post Evaluation (GA project)>

At the time of ex-ante evaluation, the TC project was consistent with the needs for reinforcing the capacity of the OEBK in management and maintenance of the Matadi Bridge as described in "Background" above. No drastic changes in the project context were observed during the project period; thus, the mentioned needs seem to have continued to the time of project completion.

At the time of ex-ante evaluation, the GA project was consistent with the need to address corrosion of the main cable of the bridge as described in "Background" above. At the time of ex-post evaluation, the project, together with the TC project, is still highly relevant with the same needs as the Matadi Bridge is an essential link of the national road number one, linking Banana to Kasumbalesa (border with Zambia) and contributes to the opening up of the sub-region of the Lower River, which has an important agriculture area providing Kongo Central Province and Kinshasa and around. To date, many important projects are developed in that area such as road, railways, and port.

#### <Consistency with Japan's ODA Policy at the Time of Ex-Ante Evaluation>

The TC project was consistent with Japan's assistance policy to the DRC as of JFY2011, which prioritized the development of transport infrastructure as an urgent issue for "Economic Development," one of the four priority areas.<sup>1</sup>

The GA project was consistent with "Accelerating Infrastructure and Capacity Development" that the Japanese government listed as one of the six pillars of support in the Fifth Tokyo International Conference on African Development (TICAD V) (2013). Also, in the same way as the policy as of JFY2011 mentioned above, the Country Assistance Policy for the Democratic Republic of Congo (December 2012) designated the development of transport infrastructure as an urgent issue for "Economic Development."

#### <Evaluation Result>

In light of the above, the relevance of the projects as combined is high.

### 2 Effectiveness/Impact

#### [TC Project]

#### <Status of Achievement of the Project Purpose at the time of Project Completion>

The Project Purpose, i.e., the improved bridge management and maintenance capacity of the OEBK, was achieved by the time of project completion. The terminal evaluation team found that OEBK was properly conducting repair work and preventive maintenance for the Matadi Bridge according to the process introduced by the project.

#### <Continuation Status of Project Effects at the time of Ex-post Evaluation>

<sup>1</sup> ODA Country Data Book 2012

The project effects have continued to the time of ex-post evaluation. The inspections that became more structured during the TC project have been continued. The continued use of the inspection sheets and the inspection reports developed under the project have allowed the OEBK to get necessary data for planning future repairs as well as the updating of the Medium-term Plan. The capacity development of inspectors during the project implementation and the transfer of technology/knowledge gained by working with Japanese experts have still allowed them to make good and formal inspections and high-level of the patrol to date. The acquisition of equipment (rolling equipment and those installed on the bridge) during the project has had a large impact on accessibility and security during the maintenance activities. The good conditions of all the equipment provided during the project and accessibility to the spare parts locally have ensured the continuity of the effect of the TC project.

Concerning the management, the problem of maintenance, which at first was only a matter of the Maintenance Department of the OEBK, has become one of the main subjects for all the OEBK's staff, due to the knowledge got during the visit of the management's team of the OEBK in Japan.

<Status of Achievement for Overall Goal at the time of Ex-post Evaluation>

The Overall Goal, i.e., continued maintenance of the Matadi Bridge, has been achieved by the time of ex-post evaluation. The budget for small to medium-scale repairs has been provided so far from the toll revenue from the Matadi Bridge (Indicator 1). A larger number of OEBK staff members than required in the Medium-term Plan are allocated (Indicator 2). Although the OEBK has neither made further updating of the maintenance manual (Indicator 3) nor officially approved the Medium-term Plan (Indicator 4), the bridge has been kept in good condition through utilization of these documents developed under the TC project. On the other hand, there are some concerns on the future status of the achievement, such as insufficient budget (from the government subsidy) for large-scale repair, which may not be able to be covered by the toll revenue, and a large number of staff members that might put pressure on maintenance costs.<sup>2</sup>

Table 1: Achievement of Project Purpose and Overall Goal of the TC Project

Aim	Indicators	Results																																													
(Project Purpose) The capacity of the OEBK in management and maintenance the Matadi Bridge is reinforced.	OEBK conducts inspection, evaluation and repair of the bridge in an appropriate manner during the project implementation period.	Status of the Achievement: achieved (continued) (Project Completion) (Ex-post Evaluation) Maintenance work given to the Matadi Bridge																																													
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<sup>2</sup> The larger number of staff than required in the Medium-term Plan is a result of the management decision of OEBK. Although it was necessary to allocate young engineers, it seems that the management did not take into consideration human resources aspects, such as limiting the number of staff by department.

		Actual	39,272,060	90,164,577	158,313,345	
2. OEBK staff are assigned based on the bridge maintenance plan.	(Ex-post Evaluation) achieved Number of staff assigned for management and maintenance for the Matadi Bridge					
	Name of unit of the organization	Role regarding management and maintenance of the Matadi Bridge	Number of staff required in the Medium-term Plan		Number of staff actually allocated (2019)	
	MAINTENANCE	Bridge Maintenance and Access Roads	36		94	
	EXPLOITATION	Toll Exploitation	31		57	
	ADMINISTRATION & FINANCES	Administration, management of human resources and finances	27		89	
	ETUDES	Project studies	16		76	
	TOTAL		110		316	
3. The maintenance manual is updated.	(Ex-post Evaluation) not achieved (practically no problem) No updating since revision under the TC project due to no necessity.					
4. The maintenance plan is officially approved.	(Ex-post Evaluation) not achieved (practically no problem) There was no official approval of the Medium-term Plan by the OEBK since it is practically regarded as approved when it was officially accepted by the Congolese government.					

Source: Preparatory Survey Report of the GA project; Terminal Evaluation Report of the TC project; Data provided by OEBK

#### [GA Project]

##### <Effectiveness>

The quantitative effects have manifested by the time of ex-post evaluation. Both the humidity inside the main cable (Indicator 1) and the traffic volume (Indicator 2) of the Matadi Bridge achieved the target. The humidity significantly decreased from more than 75% to below 50% thanks to the dry air injection system together with the new substation installed by the Congolese government under this project, which has enabled continuous operation of the machines.

The qualitative effects have manifested as well. The life of the Matadi Bridge has been extended as the corrosion inside the main cables has been prevented by the above-mentioned low rate of humidity and thanks to other outcomes of the GA project, such as waterproofing of the floor of the anchorage, renewed painting on all the cables, replacing all the caps of the bolts of the cable bands, and sealing of all the cable bands. Also, intensification of inspections and acquisition of new maintenance equipment thanks to the TC project increased the approach rate. However, the degradation of the asphalt pavement has caused the water infiltration on the deck of the bridge, which might cause corrosion to the main beams.

##### <Impact>

The expected impact, i.e., contribution to safe transportation and traffic on the Matadi Bridge, has been observed. The prevention of corrosion in the main cable, together with the above-mentioned better maintenance thanks to the TC project, has allowed them to keep their resistance properties for a long time, to support all the heavy trucks passing on the bridge and to make transport safe.

Table 2: Quantitative Effects of the GA project

Indicators	Baseline 2014 Baseline Year	Target 2019 3 Years after Completion	Actual 2017 Completion Year	Actual 2018 1 Year after Completion	Actual 2019 2 Years after Completion
Indicator 1: Relative humidity inside the main cable (%)	75% or higher	60% or less	52.5%	46.9%	46.3%
Indicator 2: Annual average daily traffic including motorcycles	1,100 vehicles (2011-2014 average)	1,100 vehicles (Status quo)	1,314	1,356	1,342

Source: OEBK

Note: The relative humidity is a ratio (%) of the measured value of the actual amount of water vapor to 100 being the maximum amount of water vapor that the atmosphere can contain at a certain temperature.

#### [TC and GA Projects]

##### <Other Impacts at the time of Ex-post Evaluation>

No negative impacts of the projects on the natural environment were observed. The projects did not involve land acquisition and resettlement, either. Regarding positive impacts, synergy effects of the coordination of the TC and GA projects have been observed such that the GA project (response to corrosion) was made possible thanks to the studies by the TC project and that the strengthened bridge management and maintenance capacity of the OEBK (thanks to the TC project) and the dehumidification system (installed by the GA project) extended the life of the bridge. Also, the OEBK pointed out the strengthening of technical transfer and cooperation link by the fact that the Japanese experts stayed for a long time on the project site. Consequently, the community integration of Japanese experts and cultural exchange between the two communities, DRC and Japan, were realized.

##### <Evaluation Result>

Therefore, the effectiveness/impact of the projects as combined is high.

#### 3 Efficiency

The efficiency of the TC project is fair. The project period was as planned (ratio against the plan: 100%). Regarding the project cost, although the planned cost is not recorded in the available documents, it should be less than 200 million yen as this project is classified into a small-scale technical cooperation project. Therefore, the actual project cost is considered to have significantly exceeded the plan (ratio against the plan: more than 162%). The Outputs of the project was produced as planned.

The efficiency of the GA project is fair, too. While the project cost was as planned (ratio against the plan: 100%), the project period exceeded the plan (ratio against the plan: 113%) due to delays in the civil works and synchronization of the activities by the Japanese experts in the parallel execution of the TC project. The Outputs of the project was produced as planned.

Combining these results, the efficiency of the two projects as combined is fair.

#### 4 Sustainability

##### <Policy Aspect>

As mentioned in “Relevance” above, the national and regional policies at the time of ex-post evaluation support infrastructure development to boost economic activities.

##### <Institutional Aspect>

The organizational structure of the OEBK for bridge management and maintenance has been in place and found to be practical. Also, the sufficient number of staff has been allocated (See the Overall Goal Indicator 2 of the TC project in Table 1). In the long-term, the current unit in charge of dry air injection system (Output of the GA project) will need to be formalized in the organization chart.

##### <Technical Aspect>

As already mentioned, the OEBK staff have enough capacity to maintain continuously the Matadi Bridge thanks to the technical transfer from the Japanese experts and working with them under both projects as well as working with Congolese experts under the GA project. In fact, the staff assigned to the new service of dry air injection system are the technicians and engineers who worked under the Japanese contractor in the GA project. Only two staff members from the Maintenance Department left the OEBK after the projects. The equipment provided by two projects are all in good condition. However, a lack of permanent capacity building program or an internal mechanism of training may have a negative effect in long-term for both the TC and GA project, although the knowledge gained from the TC project could be utilized. Many inspectors are advanced in age and the number of young senior executive seems to be limited. Also, it should be noted that the weakness in the database management (lack of computer database management) and the map digitalization remains a big challenge for the Maintenance Department. To date, only humidity data are managed on computer.

##### <Financial Aspect>

So far, the necessary cost for maintenance of the Matadi Bridge has been secured from the toll revenue as already mentioned while it may not be able to cover major repairs in the long-term and government subsidies may not be enough (See the Overall Goal Indicator 1 of the TC project in Table 1). The important point to note is the fact that the management staff in place now keep in mind the importance of maintenance for extending the life of the bridge and the security of transport. However, to date, there is no legal document related to the percentage of toll revenue for maintenance of Matadi Bridge, which makes future prospects a bit unclear. Also, part of the revenue from toll is used to cover the personnel cost and to purchase some equipment for administration tasks. As mentioned above, there is a concern that the increased number of staff members can affect the available amount of the maintenance budget.

##### <Current Status of Operation and Maintenance>

As already mentioned, the facilities installed/improved under the GA project, as well as other parts of the bridge except for the asphalt pavement, are well maintained and in good conditions.

##### <Evaluation Result>

In light of the above, some problems have been observed in terms of the technical and financial aspects of the implementing agency. Therefore, the sustainability of the effectiveness through the projects is fair.

#### 5 Summary of the Evaluation

The TC project achieved the Project Purpose of improving the bridge management and maintenance capacity of the OEBK and the Overall Goal of providing continued maintenance of the Matadi Bridge. The GA project, as well, achieved the objective of delaying the progression of corrosion of the main cable of the Matadi Bridge. The combined effects of both projects made it possible to keep the bridge in good condition and extend its life, thus contributing to improved safety. Regarding the sustainability, some problems in future prospects are observed in the technical and financial aspects, such as lack of training system, slow digitalization and uncertainty in sufficiency of maintenance budget in the long-term. Nevertheless, the policy and the institutional aspects of the sustainability are secured. As for the efficiency, the project cost of the TC project and the project period of the GA project exceeded the plan. Considering all of the above points, these projects as combined is evaluated to be satisfactory.

### III. Recommendations & Lessons Learned

#### Recommendations for Implementing Agency:

- At the receipt of the ex-post evaluation result, the Director of the Maintenance Department of the OEBK is recommended to make available two desk top computers, create a digital data base, and appoint the data base manager who will enter all data of inspections collected with the inspection sheet and add pictures to have a good lecture of the evolution of the situation. This will make data management more effective and avoid risk of losing and scattering of data.
- In one month after the receipt of the ex-post evaluation result, the Director of the Maintenance Department of the OEBK is recommended to make monthly and annual reports on maintenance activities, based on inspection activities and repair works so that

they could serve as a kind of data base and permit to all managers to get the status of the bridge and the general information.

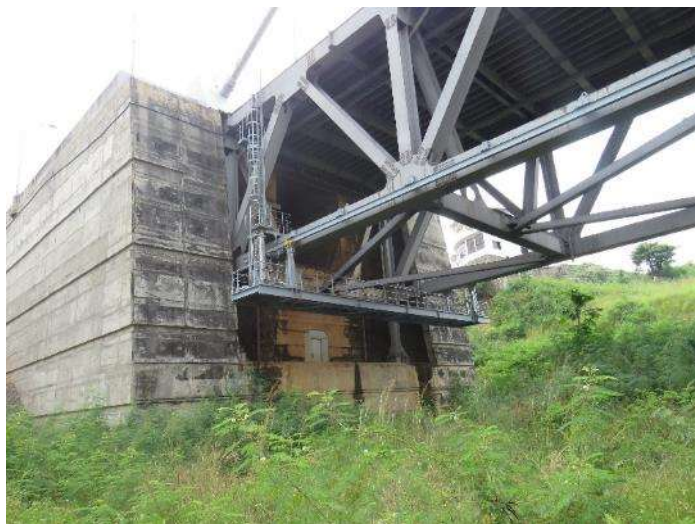
- In three months after the receipt of the ex-post evaluation result, the General Manager, the Director of the Maintenance Department and the Human Resources Managers of the OEBK are recommended to implement internal training program, according to the need of the Maintenance Department, to reinforce the capacity and upgrade human resources. As many civil engineers will get retired soon, a program of assignment of youth with the same profile should be implemented to permit technology transfer to the youth and to keep the level of maintenance. Note that the last program implemented at the OEBK to assign the youth to the Maintenance Department did not pay enough attention to their civil engineering profile.
- At the receipt of the ex-post evaluation result, the General Manager, the Director of the Maintenance Department and the Human Resources Manager are recommended to prepare an internal document concerning the bridge management to submit to the Ministry of Transport for approval. This document should limit the number of staff assigned for management and maintenance of the bridge, including the rate of toll revenue affected to the maintenance. The purpose of this document is to avoid that the main part of the toll revenue be consumed by a plethora staff. Note that beyond capacity building, budget is the key of application of knowledge.

#### Lessons Learned for JICA:

- For the management of the new service of dry air injection system introduced under the GA project, the OEBK assigned the staff who were used by the Japanese contractor because they had technology transfer from Japanese experts, which ensured the sustainability of project effects. This is a good practice that could be applied to other projects to create new services that require new competence and new staff to enhance sustainability.
- The main lesson learned from this evaluation is that combining TC and GA projects to complement each other as a mechanism of project implementation could ensure sustainability and efficiency, which would have been much lower without this complementarity.



Injection dry air system machine (GA)



Inspection trolley (TC)



Tooling stored in the warehouse (TC)



Matadi Bridge