

Country Name	<b>The Project for Improvement of Facility and Laboratory Equipment in the Institute of Technology of Cambodia</b>
Kingdom of Cambodia	

**I. Project Outline**

Background	<p>Cambodia aimed to ensure the economic growth sustainably by diversifying industries, in particular, enlarging manufacturing industry. However, the skill level of graduates from higher educational institutes in Cambodia for practical work was insufficient in that only few graduates had studied engineering majors, and in that those in major of engineering had often lacked the laboratory experiments.</p> <p>Under these circumstances, the Cambodian government had been stressing to develop human resources in engineering, mathematics and science fields as one of the key concepts in the educational sector development plan, namely “Educational Strategic Plan (2009-2013)” and established a policy of strengthening the development of human resources with skill and technique in order to satisfy labor market needs. One of the only two public institutes of higher education for engineering in Cambodia was the Institute of Technology of Cambodia (ITC).</p> <p>Due to that experimental equipment was quite old and insufficient which made it difficult for ITC to hold enough experimental classes to meet the needs of subjects in each department, it had little choice but to provide the conventional style of classes in which students carried out desk work. Thus ITC couldn't provide enough graduates (human resource) to the industries which need human resource with the practical skill.</p>			
Objectives of the Project	To enhance the educational and research development capacity by construction of facilities and procurement of experimental equipment targeting ITC, thereby contributing to development of human resources (Engineers) with practical skills for industrial fields			
Contents of the Project	<ol style="list-style-type: none"> <li>1. Project Site: Institute of Technology of Cambodia, Phnom Penh City</li> <li>2. Japanese side: Provision of grant necessary for the following items: <ol style="list-style-type: none"> <li>(a) Construction of a laboratory building (Some specifications were changed)</li> <li>(b) Procurement of experimental equipment for seven departments of ITC (Some items were cancelled or additionally procured, and specification of some item was changed)</li> </ol> </li> <li>3. Cambodia side: <ul style="list-style-type: none"> <li>Extension of electric cable to connect distribution panel, extension of water supply pipe with bulb, extension of sewage water pipe and installation of communication network</li> </ul> </li> </ol>			
Project Period	E/N Date	March 21, 2013	Completion Date	June 20, 2015 (Handover of the equipment)
	G/A Date	March 28, 2013		
Project Cost	E/N Grant Limit / G/A Grant Limit : 596 million yen, Actual Grant Amount: 594 million yen			
Executing Agency	Institute of Technology of Cambodia (ITC)			
Contracted Agencies	Main Contractor: Konoike Construction Co. Ltd., Ogawa Seiki Co., Ltd., Mitsubishi Corporation, Nishizawa Limited. Main Consultant(s): Joint venture: Intem Consulting Inc., Matsuda Consulting International Co. Ltd.			

**II. Result of the Evaluation**

## &lt;Constraints on Evaluation&gt;

• It should be noted that during and after the project period, ITC constructed some laboratories by their own funds and it received some experimental equipment from other sources than the project. Therefore, the quantitative and qualitative effects and impacts of the Project include the effect by those outputs.

## &lt; Special Perspectives Considered in the Ex-Post Evaluation &gt;

## [Indicators and supplemental information for Effectiveness]

• As for Quantitative Effects, two indicators specified in the ex-ante evaluation summary sheets such as “The number of laboratories for 7 departments targeted by the Project (unit: laboratory)” and “The number of subjects utilizing experimental equipment in classes for 7 departments targeted by the Project (unit: subject)” are used to judge the effectiveness. In addition to these two indicators, in order to examine the utilization level of the outputs by the project, “the number of students registered to the subjects utilizing experimental equipment in class for 7 departments (unit: student) (Supplemental Information 1)” and “the current utilization level of laboratories constructed (Supplemental Information 2)” and “the current utilization level of equipment provided by the project (Supplemental Information 3)” are used.

• As for Qualitative Effects, three kinds of effects are specified in the ex-ante evaluation summary sheets. They are “(1) Educational environment with necessary experimental equipment for practical training as the top Engineering Institute in Cambodia has improved”, “(2) By using experimental equipment for practical training for education and research, human resources (engineers) with practical skills will be increased\*” and “(3) To benefit the demand for human resources in the industrial area of Cambodia, including Japanese companies expanding into the country”. Among those, (2) and (3) are considered as impacts.

Note: As for (2), attempts were made to obtain more specific data to identify the number of ITC graduates employed in the field of manufacturing and construction industries and those entered into the further studies in the subject fields, but the data was not available.

**1 Relevance**

## &lt;Consistency with the Development Policy of Cambodia at the Time of Ex-Ante and Ex-Post Evaluation&gt;

At the time of ex-ante evaluation, this project was consistent with development plans such as “The Education Strategic Plan (2009-2013)”, which mentions the needs to improve facilities for basic learning activities relating to the human resource development of the science and mathematics field. At the time of ex-post evaluation, the subsequent policy, “The Education Strategic Plan (2014-2018)” emphasizes in its Higher Education sub-sector program about the improvement of teaching and learning program by introducing creative pedagogy through research and modernization of learning materials and environment such as classrooms, laboratories and libraries.

## &lt;Consistency with the Development Needs of Cambodia at the Time of Ex-Ante and Ex-Post Evaluation &gt;

This project was consistent with Cambodia’s development needs of higher education at the time of ex-ante evaluation as described in “Background” above. At the time of ex-post evaluation, there are still continuing needs for producing engineers with practical skills for the

development of industrial sector. In this respect, ITC has played a crucial role to support the government to realize the vision of “Industrial Development Policy (2015-2025)” which aims to increase Gross Domestic Products’ share of industrial sector. Therefore, laboratories constructed and equipment procured by the project have been highly needed for ITC educational development as well as the development of industrial sector.

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

One of the Pillars of Priorities stated in the “Country Assistance Policy for Cambodia, April 2012” is “Strengthening of the basis for economic activities”. One of those activities includes “Strengthening of Private Sector”, in which Japan supports for the human resources development for the industrial sector with special focus on the human resources in the technical fields (e.g., engineers and technicians) and middle-level management who are required in the expanding manufacturing industries.

<Evaluation Result>

In light of the above, the relevance of the project is high.

## 2 Effectiveness/Impact

<Effectiveness>

The project objective of enhancement of the educational and research development capacity by construction of facilities and procurement of experimental equipment targeting ITC has been achieved.

For quantitative effects, the number of laboratories targeted by the project for seven departments increased to 44 which has mostly achieved the target of 45 (Indicator 1). It was identified by the study that ITC constructed 21 laboratories by their own funds in order to meet the demands. As a result, there are 65 laboratories available for seven departments at present. The number of subjects utilizing experimental equipment in class for seven departments increased to 178, achieving the target of 176 (Indicator 2). It was also found by the study that the approximately 30 % of experimental equipment (in pricewise) are those provided by other projects, such as the Cultural Grant Assistance for “The Project for the Improvement of Educational Equipment of the Department of Geo-Resources and Geotechnical Engineering of the Institute of Technology of Cambodia” and Technical Cooperation for “The Project for Educational Capacity Development of the Institute of Technology of Cambodia. Therefore, the increase of subjects utilizing equipment is attributable to the combined effects of the project and other projects. In terms of utilization of the laboratories and equipment, the number of students registered to the subjects utilizing experimental equipment in class for all seven departments has increased from 1,985 in 2012 to 4,065 in 2017, and to 4,735 in 2018. This implies that more and more students are utilizing experimental equipment (Supplemental Information 1). Furthermore, it was confirmed by the study that the laboratories constructed and equipment provided by the project are used accordingly as planned (Supplemental information 2 and 3).

As for qualitative effects, according to the questionnaire survey and interview with teachers and students of ITC, the new lab building equipped with modern equipment has enabled a deepening understanding of students on the contents of subjects through experiments under practical settings. For example, as for the Modeling subject at Electrical and Energy Engineering Department, students have chances for the first time to do experiment on their own design on Modelling, which is fundamental element for robot development.

<Impact>

According to the survey conducted by ITC, the absolute number of ITC graduates from the engineering or technicians courses has drastically increased. The number of ITC graduates who got employed increased from 304 in 2012 (before project) to 444 in 2015 (after project completion) and further increased to 596 in 2017. Those ITC graduates who continued further studies increased from 87 in 2012 to 108 in 2015 and further increased to 173 in 2017. This suggests that the project has contributed to produce human resources with practical skills by using experimental equipment for practical training and it is likely to benefit the demand for human resources in the industrial area of Cambodia. According to the questionnaire survey and interviews, ITC has continuously received the request from companies that they should increase the number of graduates to meet the demand of job market. In order to cope with such market demands, ITC established an Office of University-Industry Linkage and Cooperation in 2016 for the well cooperation with private sector. No negative impacts by the project were found.

<Evaluation Result>

Therefore, the effectiveness/impact of the project is high.

### Quantitative Effects

Indicators	Baseline 2012 Baseline year	Target 2017 5 years after completion	Actual 2017 5 years after completion	Actual 2018 6 years after completion
Indicator 1: <sup>(1)</sup> The number of laboratories for seven departments	37	45	65 (44)	65 (44)
Indicator 2: <sup>(2)</sup> The number of subjects utilizing experimental equipment in class for 7 departments	129	176	178	178

Sources: Preparatory Survey Report , Questionnaire and interviews with Implementing Agency

Note: (1) The number in parenthesis excludes 21 laboratories constructed by the ITC’s own funds.

Note: (2) It is considered that the combined effects of equipment provided by both of the project and other projects are reflected on these figures.

### Supplemental Information 1: Number of students registered to the subjects utilizing experimental equipment in class for seven departments

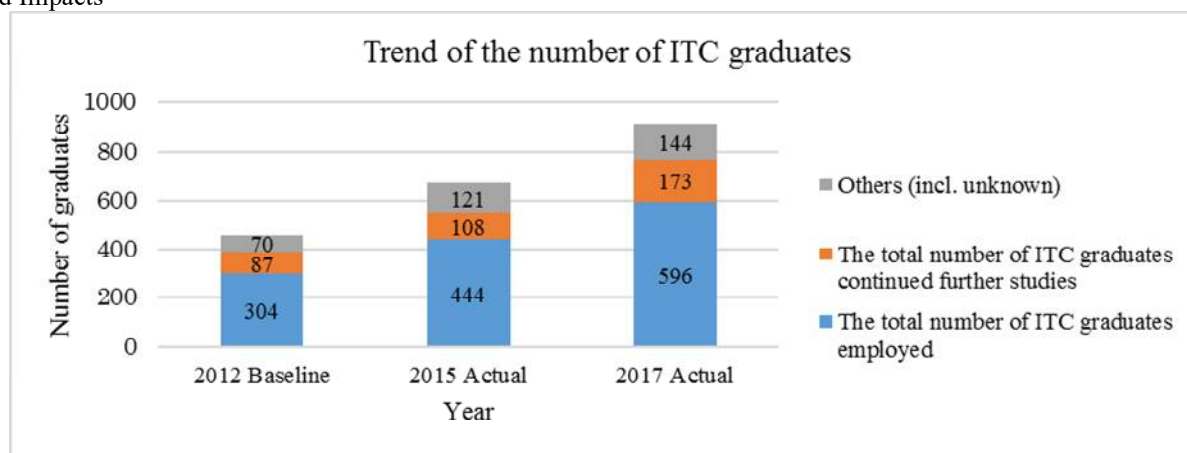
Department Name	Baseline 2012 Baseline year	Actual <sup>(3)</sup> 2017 5 years after completion	Actual <sup>(4)</sup> 2018 6 years after completion
Electrical and Energy Engineering	409	900	909
Industrial and Mechanical Engineering	319	815	819

Food Technology and Chemical Engineering	279	650	679
Civil Engineering	448	420	948
Information and Communication on Engineering	164	350	364
Geo-Resources and Geotechnical Engineering	120	250	270
Rural Engineering	246	680	746
Total	1,985	4,065	4,735
% increase against baseline	na	205%	239%

Sources: Preparatory Survey Report, Questionnaire and interviews with Implementing Agency

Note: As for (3) and (4), it is considered that the combined effects of equipment provided by both of the project and other projects are reflected on these figures.

#### Expected Impacts



Source: Ex-ante Evaluation Sheet, Questionnaire, interviews with Deputy Director

#### 3 Efficiency

While the project cost was within the plan, the project period exceeded the plan (ratio against plan: 100%, 133%). Having been affected by the big fluctuation of foreign exchange rates between the time of the Outline Design and that of the Detailed Design, it was necessary to reduce the number of items of equipment provision and those for facility renovations in order to execute the project within the scope of planned cost. Additional tender procedures were followed based on the re-designed plan. The residual funds after several tender procedures were used to obtain some items of equipment and renovation once deleted from the original plan. As a result, the outputs were produced, but not as planned. Therefore, efficiency of the project is fair.

#### 4 Sustainability

##### <Institutional Aspect>

The Higher Education Department of Ministry of Education, Youth and Sport (MoEYS) assumes the overall responsibility of the higher education sector and is responsible for large scale construction and provision of equipment and also for supervising higher education institutions to carry out the operation and maintenance (O&M). Each higher education institution is independently responsible for course programming, curriculum development, collection of tuition and cost control, thus actual operation and maintenance of buildings constructed and equipment provided by the project are carried out by ITC. There are two-levels of O&M supervision system in ITC. Under level 1, daily base maintenance is carried out by the Maintenance Office of Lab Equipment at each department in which there are two or three technicians and one engineer assigned. Under level 2, being responsible for all equipment, building, water electricity and IT services, the Technical Service Office handles critical and serious problems. It is identified by the study that ITC has recruited one engineer for each lab and three staff for Maintenance Office of Laboratory Equipment. In total, there are ten more staff for O&M now compared with what was before the project and it is considered as sufficient to sustain the effect by the project.

##### <Technical Aspect>

Technical skill of teachers and technicians is sufficient to sustain O&M of laboratory constructed and equipment procured by the project because they received proper training from suppliers before handing over the equipment. In addition, JICA technical cooperation project, "Project for Educational Capacity Development of Institute of Technology of Cambodia (2011-2015)" has contributed to the improvement of technical capacity of technicians and teachers in three departments, such as Electrical and Energy Engineering, Industrial and Mechanical Engineering and Geo-Resources and Geotechnical Engineering that were also supported by the project. In order to further improve their technical skills, ITC also has a system to send technicians to abroad for technical training. Some technicians have been trained under such program and are expected to work as trainers for the lab staff. Furthermore, lab manuals have been developed and used properly under the supervision of teachers.

##### <Financial Aspect>

The financial condition as shown below explains that ITC has sufficient budget secured for sustaining the effect achieved by the project. The total revenue from tuition fee has been increasing. ITC also receives funding from MoEYS and the assistance from other countries such as France and Belgium.

Currency Unit in USD

Revenue items	Baseline 2012-13	2015-16	2016-17	Ex-post evaluation 2017-18
ITC tuition	1,060,000	1,502,990	1,662,000	1,769,800
Subsidy from MoEYS	218,555	883,941	539,018	608,200
Assistance from other external donors	461,106	287,874	250,583	308,397

Total		1,739,661	2,674,805	2,451,601	2,686,397
% increase against baseline		na	154%	141%	154%
Cost items		Baseline 2012-13	2015-16	2016-17	Ex-post Evaluation 2017-18
Payroll Total		1,043,111	1,645,051	1,326,690	1,380,000
Development Cost (non-recurring)	Facility, equipment	90,539	80,245	156,170	155,500
	Others	37,929	55,248	56,469	72,200
	Total	1,171,579	1,780,544	1,539,329	1,607,700
Operating expenses	Repair/maintenance	170,247	338,817	373,140	150,900
	(% increase against baseline)	na	228%	219%	89%*
	utilities	161,055	179,101	189,096	235,000
	Others	161,055	179,101	189,096	235,000
	Total	368,062	645,627	687,805	519,500
Grand total		1,539,641	2,426,171	2,227,134	2,127,200
% increase against baseline		na	158%	145%	138%

Source: Questionnaire survey with Implementing Agency

Note: In 2015-16 and 2016-17, ITC had a big investment projects on construction of new building and other development activities such as concrete pavement, road pavement in the campus. Therefore, the overall budget for maintenance in 2017-18 was decreased after completion of those projects.

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

All of equipment provided by the project are currently in operation. Consumables for laboratory are managed properly by Technical Service Office. Some spare parts for replacement or for repair are available locally or should be imported from other countries.

#### <Evaluation Result>

Therefore, the sustainability of the project effect is high.

#### 5 Summary of the Evaluation

The project has achieved its objectives, “to enhance the educational and research development capacity by construction of facilities and procurement of experimental equipment targeting ITC” as it was observed that the number of laboratories for seven departments increased mostly achieving the target. With the combined effects of experimental equipment provided by other projects, the number of subjects utilizing experimental equipment in class for seven departments increased as planned. Furthermore, the number of students registered to the subjects utilizing experimental equipment in class has more than doubled. Positive impacts were observed in which the number of ITC graduates employed as well as those entered into the further studies has been increasing.

As for sustainability, there is no problem in institutional, technical and financial aspects. Regarding efficiency, project period exceeded the plan. Considering all of the above points, this project is evaluated to be highly satisfactory.



An exterior view of Lab Building



Lab of Electrical & Energy Engineering