COOPERATION BETWEEN GOVERNMENT, UNIVERSITY AND INDUSTRY FOR ENGINEERING EDUCATION —A CASE STUDY IN PAPUA NEW GUINEA—

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ABSTRACT

I have great pleasure in presenting before you a unique model of cooperation between the Government, our University and the Industry for the creation of a very relevant Engineering Education Facility, which is only one of its kind in our country, namely, Papua New Guinea(PNG).

The paper presents an overview of the processes and mechanisms created to establish a New Department of Mining Engineering at the PNG University of Technology, through active help and assistance provided by the national government and mining companies located in our country.

1. INTRODUCTION

The paper describes the creation of an entirely new Department of Mining Engineering through excellent cooperation between the Government, Industry and University.

Before I start describing the process of setting up of this New Department, let me describe briefly Papua New Guinea and its overall higher educational setup.

Papua New Guinea is located north of Australia, east of Indonesia and South East of Philippines. Most of the 463,000 square kilometres of its total land area is sited on the eastern half of the island of New Guinea, it also comprises handful of other relatively large islands and hundreds of smaller areas. It has a population of 4 million and the per capita income is US\$900.

The country is rich in natural resources. It is well endowed in copper and gold and has commercially viable oil and gas reserves. Some 80% per cent of its land surface is covered by rainforests which yield exportable

timber. The mineral industry of Papua New Guinea is an important sector of the country's economy. Mineral exports constitute nearly 80% of total exports and taxes, revenues and dividends from the mining projects constitute 20% of the total revenue of the government. There are two Universities in PNG. The University of Papua New Guinea at its capital, Port Moresby, concentrates on the arts, pure sciences, law and medicine. PNG University of Technology, located in Lae, which is the second largest city in the country, have courses in Civil, Mechanical and Electrical Engineering; Surveying, Business Studies, Agriculture, Forestry, Applied Sciences, Applied Physics, Architecture, Languages, Mathematics and Computer Sciences. Government of Papua New Guinea decided in April 1989 to establish a New Department of Mining Engineering at PNG University of Technology (UNITECH).

I now present before you the cooperation and help received from the Government and Industry for establishing this entirely new Department.

2. HISTORICAL BACKGROUND

In 1972, Bougainville Copper Ltd, a subsidiary of CRA Ltd of Australia, started copper and gold production in PNG and the attempts were made to start a mining engineering programme at Unitech in 1972, but could not succeed because at that time, there was only one mine operation and therefore will not be able to absorb a full batch of mining engineers, which may be produced by the new programme.

In the eighties, when Ok Tedi Mine started producing gold, fresh interest kindled in the country to start mining engineering courses and in 1988 when Misima

Mine was also being constructed, the then Vice Chancellor of PNG University of Technology, Mr. Moseley Moramoro invited Prof. Ray Whitmore of Australia to have another look at the possibility of starting the mining engineering courses. The effort also received support from the Commission of Higher Education (CHE), PNG Chamber of Mines & Petroleum and the Department of Minerals & Energy. Two working groups, one based in Port Moresby and another at Unitech, Lae were formed to firm up proposals and submit them to the Government. Based on the recommendation of the Port Moresby group headed by Mrs. Mina Siaguru, Chairperson of Commission of Higher Education, on April 12, 1989, the National Executive Council approved the establishment of the Department of Mines & Petroleum at the PNG University of Technology, Lae.

Although the original intention of the Government was to establish a Department of Mines and Petroleum, it was felt that there was a more pressing need for Mining Engineers so the department commenced operation as the Department of Mining Engineering in July 1989, when I was appointed as the Foundation Professor and Head of the Department.

3. FUNDING

National government has been very supportive and enthusiastic about the program and have provided funding to the extent of about US\$5 million to fund the building construction, staff salaries and other operational expenses.

The mining industry has also been very supportive of the program and have contributed a total of US\$0.5 million as detailed below, to fund the equipment purchases of different laboratories of the Department.

Highlands Gold Ltd, a subsidiary of Mt. Isa Mines Ltd, led the way in January 1990, with a donation of US\$50,000 to fund the equipment purchases for the Computing Laboratory and the Department decided to name this Laboratory as Highlands Gold Computing Laboratory in recognition of that Company's donation. CRA Minerals Ltd, followed with a donation of US\$60,000 to fund the equipment purchases for the CRA Geology Laboratory.

Ok Tedi Mining Ltd, a Joint Venture Company of BHP Australia, in August 1990 gave another boost to the Department with a donation of US\$100,000 to fund the equipment purchases for the Ok Tedi Mining Laboratory.

Placer Niugini Ltd, topped off the year with the donation of US\$50,000 for the equipment purchases for Placer Niugini Mine Planning Laboratory.

In 1993, when we constructed the extension of our building to house the Mineral Processing facilities, following companies again contributed handsomely to equip our laboratories:

Highlands Gold Ltd =	US\$30,000 for the purchase of an Autoclave
Ok Tedi Mining Ltd =	US\$35,000 for Flotation and Cyclosizer machines
CRA Minerals Ltd =	US\$25,000 for UV Spectrometer and Fire Assay Furnaces.

In 1995-96, we have again gone to these mining companies asking for donations to upgrade our Computing Laboratory. These mining companies are expected to donate about US\$50,000 to modernize our Computing Laboratory.

Mining Companies have also been very generous in providing vacation employment for our students during the long year-end vacation period and have provided scholarships to many of our students.

The Department has also been very fortunate in receiving support from external agencies and professional societies, as detailed below:

International Development Program (IDP) of Australian Universities and Colleges has sponsored the visits of Academic Experts from Australia to advise the Department in its curriculum and overall development. IDP has also sponsored a number of visits by Departmental Staff to Australian Universities and donated books for the Departmental Library. Total IDP funding in 1989-94 period was of the order of US\$150,000.

The Australasian Institute of Mining and Metallurgy, Institution of Mining & Metallurgy and Mining Journal Ltd. have donated a large number of books for our Library.

Japan International Cooperation Agency (JICA) have

donated an X-Ray Fluorescence Machine valued at over US\$200,000 and have deputed a Senior Faculty Member to our Department for over 5 years. They also provided travelling & higher education scholarships to our Staff Members. Total JICA assistance to our Department was of the order of US\$1 million.

Therefore the total funding breakup looks as below:

PNG Government	=US\$5.00 million
Mining Companies	=US\$0.50 million
IDP of Australia	=US\$0.15 million
AUSIMM, IMM & MJ	=US\$0.10 million
JICA	= <u>US\$1.00 million</u>
TOTAL	= <u>US\$6.75 million</u>

4. DEPARTMENTAL STRUCTURE

The Department manages two degree programmes- a Bachelor of Engineering in Mining Engineering and a Bachelor of Engineering in Mineral Process Engineering.

The Department has 25 staff which includes 7 expatriate teaching staff, 6 national lecturers, 12 technical and secretarial staff.

Total students vary between 80 to 100 per year. We graduate about 25 graduates in both streams every year. In 1995, we also admitted first MPhil Student in our Department.

5. MINERAL INDUSTRY ADVISORY COMMITTEE

To maintain constant interaction with the mineral industry and the governmental agencies, a Mineral Industry Advisory Committee was formed in February 1990.

The Committee consists of senior executives from the mining and petroleum industries and also from government departments associated with these industries and tertiary education.

The terms of reference of the Committee are:

- (1) To promote a good working relationship between the University, Industry and Government.
- (2) To provide a forum to receive advice and feedback from employers.
- (3) To provide the Department with feedback on the quality and quantity of graduates produced by the University.

- (4) To provide advice and assistance on staffing and physical facilities.
- (5) To assist the Department with industrial training, vacation employment and field trips.
- (6) To assist with the provision of visiting lectures.
- (7) To encourage research and consultancy for the Department.
- (8) To advise and assist in the development of courses and facilities in mining, mineral processing, petroleum and geological engineering.
- (9) To provide information on careers in mining and petroleum in industry and government to High Schools and Universities.
- (10) To provide other assistance as necessary for the education and training of PNG citizens in the mineral engineering areas.

The Committee is headed by Mr. Ian Goddard, Managing Director, Highlands Gold Ltd. It meets one/two times per year and its deliberations have been of tremendous value to the Department. This Committee provides a very useful link to the Mining Industry for the healthy development of the Department. In fact this model of Advisory Committee for our Department has been copied by other Departments in the University.

6. CONCLUSIONS

The Department of Mining Engineering at the PNG University of Technology has come a long way from the initial concept in 1988 to the present day. We are finally creating most modern facilities for the education and training of mining and mineral process engineers as required by the mining industry.

The Department has been very fortunate in attracting lecturing staff from all around the world and has generated considerable goodwill amongst the government, mining companies, and the community at large.

Students are very eager to do mining and many of the best foundation (first) year engineering students are opting for mining engineering. This has given the department the advantage of having good capable students, which should enable us to maintain high academic standards.

(平成8年4月24日 東南アジア太平洋地域工学教育国際会議 基調講演から転載)