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# UNIVERSITY-INDUSTRY COOPERATION IN ZAMBIA[1/]

by

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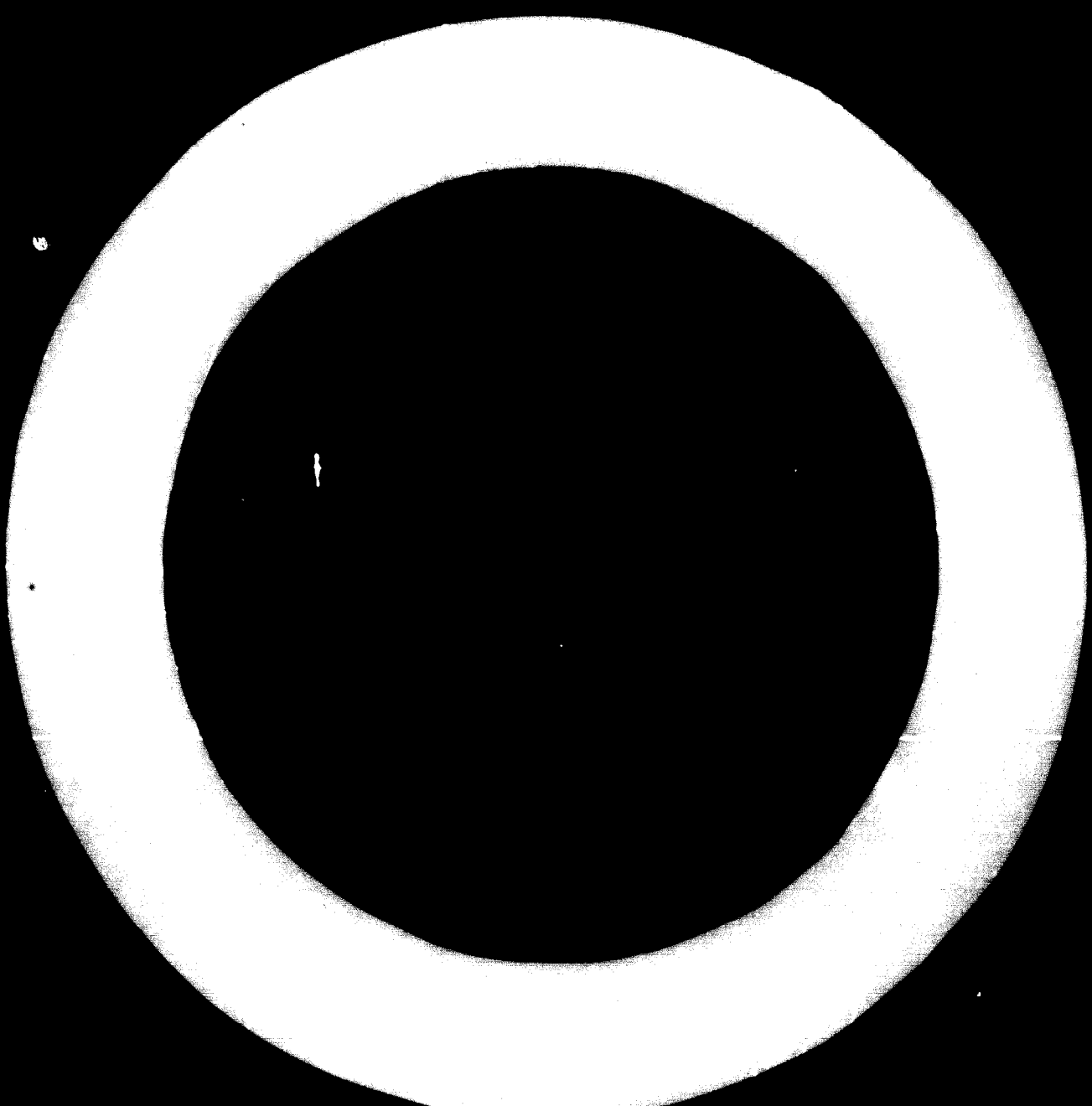


## Introduction:

The great necessity for close cooperation between the University as the seat of learning and new ideas on the one hand, and Industry as the locations of applied knowledge, on the other hand, cannot be overemphasized. Zambia like most developing countries suffers from acute shortage of trained manpower and the need to maximize the use of available human resources in providing local manpower by close cooperation between the country's only University and the Industry is of high priority. There is also the necessity to gear the training of the manpower to the needs of the local environment. There are many areas of studies in which the University of Zambia cooperates with Industry, but this paper will concern itself solely with the activities of the School of Engineering.

More than ninety per cent of professional engineers in Zambia at present are foreigners. The high cost of hiring foreign engineers and the general demand for Zambianization of professional posts make it necessary for Zambian Industry to ensure that the Zambian engineers who come to fill these posts are as good if not better than the foreign engineers they are replacing. To this end, industry cooperates in many ways with the school of engineering in the whole process of engineering education. Two main areas of cooperation, curriculum development and vacation industrial training will be discussed in details in this paper. At the end of the paper, a list of other areas of cooperation which exist in Zambia will be given.

## The University of Zambia Engineering Programme:

It is pertinent at this stage to give a brief description of the engineering degree programme which operates in Zambia. The University of Zambia operates a five year engineering degree programme starting from the General Certificate of Education Ordinary Level. The first year is spent in the school of Natural Sciences studying basic physics, chemistry mathematics and African studies. In the second and third

years, the students study general engineering courses covering - engineering drawing, workshop technology, applied mechanics, fluid mechanics, mathematics and electricity. In the fourth and fifth years, the students specialize in one of civil, electrical or mechanical engineering. The course is strictly not a sandwich course, since there are thirty-five weeks of university work and twelve weeks of long vacation. Each student is however required to have completed successfully at least six months of industrial training before he can graduate.

University-Industry Cooperation in Curriculum Planning and Development:

In seeking to ensure that the engineers produced in Zambia can meet the needs of Zambian Industry, the School of Engineering has set up an advisory committee. This committee consists of all the academic staff, in engineering (about nineteen in number) plus about five members from each of the three branches of engineering drawn from Industry, government and other technical institutions. There are also a few other people from the University representing the administration and other relevant faculties. The Advisory Committee meets about two to three times a year to look at the objectives of the school of engineering, examine its curriculum and offer advice on these and other problems which face the school. Being a young school (only five years old) with a high rate of staff turnover, there is a continuous flow of ideas for changes and modifications to the curriculum. However, with full discussion of these ideas with people from industry, the country is assured of a stable curriculum which is geared to its needs and not to the whims of the academic staff. The importance of this committee as a stabilizing factor will be appreciated more when it is realized that the nineteen members of academic staff come from eight different countries.

Besides offering advice the advisory committee provides a form of moral support for the school when it has to justify its curriculum before the University Senate. The Senate being made up of various academic disciplines may not be in a position to examine critically the engineering programme, but an approval of a programme by the advisory committee serves as some form of assurance.

The experience in Zambia is that an advisory committee like this is invaluable. However, care has to be taken to ensure that it does not degenerate into a form of rubber stamp body. The general tendency is that if they are presented with a programme, and asked to approve it, they will do so. It has been found that one of the ways of getting maximum discussion on the programme is to start by inviting

comments on the controversial aspects of it. Once this starts, they will be able to come out and give their views on the programme. Another way which has been found to produce good results is to invite some of them to prepare papers which will then form the basis for the discussion.

It is fair to conclude that the rapid progress made by the school of engineering could not have been achieved without the help of the Engineering Advisory Committee.

Vacation Training:

In a developing country like Zambia two factors make it very essential that as early as possible, the students should have adequate contact with engineering practice in industry. The first is the fact that the students' previous background provides very limited contact with developments in modern technology. The second is that because of the absence of sufficient trained manpower, graduates occupy responsible positions very early in their career. Industrial Vacation training takes place the end of the second, third and fourth years.

The training programme is organized by four training officers who are fulltime academic staff. The school training officer is responsible for coordinating all the training functions of the various departments. He undertakes initial contact with industry at the beginning of the academic year to find out the number of students each company can take. Each of the other three training officers is responsible for the detailed programme of the students in his department. Most industries in Zambia now have training officers who liase with their University counterparts in organizing and executing the programme.

The University training officers betweem themselves arrange for the placement of the students well before the beginning of the vacation. The general policy is that students who are sponsored by companies go to their sponsors for their vacation training. Those who are not sponsored are then placed with companies which have no sponsored students or those who feel they can take in more than the number they are sponsoring.

The School of Engineering generally gives the industry an idea of the sort of programme which a student is supposed to go through depending on his year of study. The broad outline is that at the end of the second year they should be given general engineering experience in the workshop. As much as possible, they should be involved

in manual work and learn to get their hands dirty. At the end of the third year of study, they should concentrate more on the branch of engineering in which they are specializing. At the end of the fourth year, they should be given more challenging assignments covering the areas of design, installation, maintenance and similar engineering management problems.

To control and evaluate the programme, the staff of the school of engineering visit each student twice during each training period. The first visit normally takes place two to three weeks after the beginning of the training period. The object of the visit is to see how the students are settling down and to discuss the programme which the industry has prepared for each individual student. The second visit is normally towards the end of the training period and the aim is to assess the effectiveness of the training.

At the end of each training period, each student summarizes his own experience and also shows a log book in which he has recorded his day to day activities. The industry also submits a report assessing the students' attitudes and performance. These two reports together with the reports of the visiting academic staff form the basis for evaluating the particular training period.

Last academic year, about 120 students went through the vacation training programme with nearly 40 organizations.

Observations:

1. Many industries are willing to cooperate in the programme since it gives them a chance of getting scarce Zambian personnel. The programme affords then the opportunity of evaluating a potential employee in a way which cannot be done in a one hour interview.

2. Some problems are normally enoountered for the following reasons:

   (a) The industry normally pays the student an allowance during the training period and the employers have to satisfy themselves that it is a whortwhile investment.

   (b) In most Zambian industries, the general management attitude is to cooperate fully with the University. The trend however is that most of the sectional engineers who have to supervise the students directly are expatriates. They tend sometimes to see the Zambian students as

a threat to their job security. The result is that some of them may either not be interested in giving the student a proper training or may in fact be hostile to the student

(c) In many establishments, the number of professionally qualified engineers who can understand the sort of problems students in such situations face is limited. The result is that even with the best will in the world, such a company cannot give the student the amount of supervision he needs.

(d) Sometimes, as a result of pressure of production or lack of facilities, some companies tend to let the students just watch those who are working instead of participating fully in the work going on.

3. As the number of students increases, more difficulties will arise in being able to place all the students and also in ensuring that adequate training is given to them. The first problem is one of finance. To most industries, students on vacation training are non-productive, and unless a firm is assured that they have a definite hold on a student, they may be unwilling to spend much money on him. One way which has been suggested for dealing with this problem is to request the Government to establish an industrial training fund to which all industries that use engineers have to contribute. This fund will then be used to finance the programme thus making the demand on individual industries that of facilities only. This idea has to be fully worked out before an approach is made to the government. On the question of facilities, it is hoped that Zambian industry will continue to expand thus minimizing any problem that might arise.

4. No formula has yet been devised for grading the training each student gets, at present the assessment is either satisfactory or unsatisfactory. It is hoped that in future, a way might be worked out for a more effective assessment.

The experience of the University of Zambia so far is that the programme inspite of its difficulties is very valuable not only in preparing the students for life in industry but also in helping them understand some courses in the higher years particular courses in design and production.

The programme also affords an opportunity for the academic staff to know what is happening in industry, because during their visits to industry they seize that opportunity to discuss mutual engineering and management problems.

OTHER AREAS OF UNIVERSITY-INDUSTRY COOPERATION IN ZAMBIA

1. Endowed posts:

Industry in Zambia has been helpful to the University by endowing some posts. The Industries normally endow these posts in areas which are most pertinent to their field of activity. For example, there are two endowed Professorships by the Mining Industries, one in Mining and the other in any other field of engineering. Discussions are with some industries for endowing posts in the field of industrial engineering and agricultural engineering

2. Consultancy:

More and more members of the academic staff are called upon to carry out consultancy work for industry. This aspect was slow to start but within the past year the pace has increased. In fact, the school of engineering is considering the establishment of a production unit which will increase its outside activities.

3. Staff research and student projects:

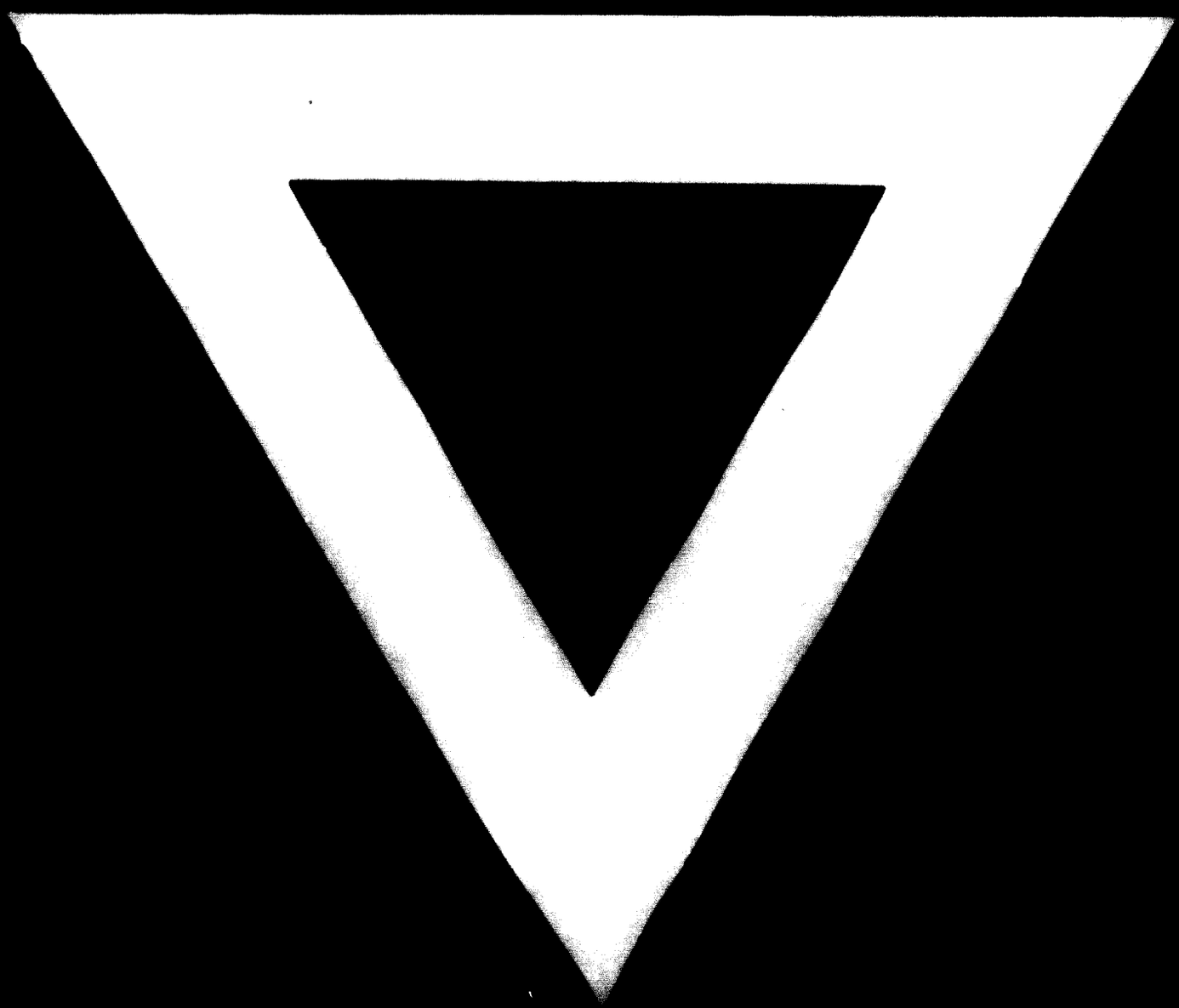
The final year students are normally required to carry out a project. More and more, the problems which are being handled are direct problems from industry. The research activities of the academic staff in a good number of cases involve either direct collaboration with industry or help from industry in the form of data, and equipment.

4. Graduate Training programme:

There are efforts to extend the vacation training programme to cover the first two years of graduate status. The aim is that the University advises the industry on the best sort of programme which will give maximum benefit to the graduate and his employers. This aspect has not yet been fully developed.

Conclusion:

The cooperation between industry and University, in Zambia started when the University was established. There was some inertia at the beginning, but the last few years have seen major progress. There is now a complete awareness that industry and University have the same objectives and they must cooperate fully in order to make maximum use of the available engineering facilities and scarce manpower.



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