9th WEDC Conference: Sanitation and water for development in Africa: HARARE: 1983

TRAINING OF TREATMENT PLANT OPERATIVES

by J McKENDRICK

INTRODUCTION

Local authorities, governments and international funding agencies throughout the world have in the past spent, and will in future spend, vast sums of money on the design and construction of water and sewage treatment plants both in urban and rural areas. Now that we are in the "Water Decade" more interest is being shown and funds being made available to provide developing countries with satisfactory and hygienic water supplies and safe waste water treatment systems, especially in rural areas.

Notwithstanding past developments and future proposals, the sums of capital money spent on these systems have very often been negated both in developed and developing countries. This has not been because of the lack of professional staff and skills but because of a severe shortage of trained and certified operators capable of understanding and carrying out the day-to-day routine functions necessary to maintain and operate such plants in an efficient manner so that the plants produce the goods for which they are designed, and ensuring that the capital money spent is not wasted and that the public are assured of a safe, hygienic supply of water, a safe and hygienic waste water treatment system and a healthy environment where people can carry out their normal duties in life without fear of disease.

HISTORICAL DEVELOPMENT OF TRAINING IN ZIMBABWE

Training of sewage works attendants was introduced into this country in 1962 by the then Institute of Sewage Purification (Southern Africa Branch). The parent institute is a United Kingdom-based organisation with world wide recognition for the high standards of its aims and objectives in this field.

The system of staff engagement in those days was to employ an artisan qualified in mechanical skills and train him on site to operate a sewage or water treatment plant. The proposed course in 1962 adhered to this principle but the course aimed at giving those employed in the field of sewage treatment the opportunity of formal training on a national basis resulting in the certification of successful students. Unfortunately, a similar course for training attendants in the water treatment field was not available at that time.

The Institute selected various centres throughout Southern Africa where professionally trained and experienced members of the Institute were willing to offer their services in the training of sewage treatment plant attendants. Harare was chosen as one of the centres and the offer was snapped up because of interest in the training and certification of attendants both in the fields of sewage treatment and water treatment.

Local authorities, government agencies and mining companies were then informed of the proposed training scheme and asked to submit the names of potential candidates to the Institute as well as the name of the training centre of their preference for the training of their staff. In that first year, nine attendants chose to be trained in the then City Engineer's Department of this City.

Upon registration, the candidates were sent a training handbook for sewage works attendants compiled by associate members of the Institute. After some six to nine months of home study they then spent one week in the Department where they were given formal tuition in theoretical and practical aspects of sewage treatment. At the end of that week the candidates were given an oral examination by the local centre and approximately one month later were required to sit a written examination which was sent to and marked at the Southern Africa Branch Headquarters. Those who were successful were issued with a certificate signed by the President of the parent body in London.

This system of training sewage works attendants continued until 1972. The pass rate during this time varied from 40% to 60%, with many First Class Passes being recorded in this country.

In 1972 The Institute of Water Pollution Control (Southern Africa Branch) decided that future training in South Africa would be done through technical colleges and that training in sewage treatment would be combined with training in water treatment. Although we agreed that the proposals were basically sound, they would not have been practical in this country for the following reasons:-

(1) Many of the smaller works in this country were controlled by only

one attendant and it would have been impossible to release them from their duties as would have been required by the technical college system.

(2) There were only two technical colleges in this country at that time and these colleges felt that the numbers involved were too small for them to consider this type of training.

(3) There were no experienced or qualified lecturers in this field to lecture to students on a full-time basis.

Because of this, an approach was made to the Institute by the Department for permission to continue the Sewage Works Operators Course in this country based on the past system. This request was granted and since then this course has been held every eighteen months or two years with the examinations being set and marked by the Chief Chemist in the Department, the results being sent to the Branch Headquarters who then organises the certificate signed by the President of the parent body in London to be sent to successful candidates.

MINISTRY OF WATER DEVELOPMENT:
SUB-COMMITTEE - OPERATOR TRAINING

In the mid-1970s concern was felt in the Department about the lack of qualified artisans applying for posts as attendants in Council's water and sewage treatment plants. Enquiries showed that the same pattern was emerging in other local authorities where the same concern was being expressed.

An approach was made to the then Ministry of Water Development which resulted in the formation of a sub-committee in 1978 to study the problem and attempt to find satisfactory training and certification of operators and attendants both for employees on sewage treatment plants and water treatment plants. Enquiries were made locally and as far afield as the United States of America. No definite conclusions were reached by this committee and because of pressure of work, shortage of staff, emigration and the war the sub-committee ceased to exist in 1979.

TRAINING OF WATERWORKS ATTENDANTS,
CITY OF HARARE.

Since the inception of a training scheme followed by certification for sewage works attendants, it was noted that the turnover of staff on Council's sewage treatment plants fell considerably, while at the same time it was noted with concern that the turnover of staff on Council's water treatment plants remained alarmingly high.
It was obvious that the training and certification of sewage works attendants was providing job satisfaction, and a survey confirmed this and also highlighted the fact that the attendants no longer considered themselves to be uninterested, unskilled workers but now looked upon themselves as highly-trained, skilled workers within the community, akin to any artisan. A similar survey carried out among waterworks attendants produced exactly opposite results, and it was felt that training and certification of waterworks attendants on a par with sewage works attendants had now become a necessity.

Enquiries throughout the world for such a training and certification programme for waterworks attendants failed to produce any positive results at that time. Undeterred, however, the staff in the Chemical Treatment Section of the laboratory set about the long and arduous task of preparing a syllabus and course for waterworks attendants based on the same standards as that operated by the Institute of Water Pollution Control for sewage works attendants. Unfortunately, a recognised certificate could not be found for this course; however, a certificate was designed and issued under the auspices of the City of Harare, signed by the Chief Chemist and the Director of Works. At least now the waterworks attendants had a tangible goal to look forward to which had not existed for them in the past.

The first examinations were held in 1979 but had only one successful candidate. Further examinations were held in 1980 but, again, produced only one successful candidate. Because of the apparent lack of results, it was decided to run a series of lectures and demonstrations for a period of nine months before the next examinations. This appeared to be the answer to the problem, as when the next examinations were held in 1982 three out of seven candidates were successful.

IMPORTANCE OF TRAINING AND CERTIFICATION OF ATTENDANTS IN THE CITY OF HARARE

Apart from the obvious advantage of more efficient operation of Council's Water and Sewage Treatment Plants, a certain degree of job satisfaction and standing in the community was given to the attendants. Successful attendants were awarded an upgrading of their posts thereby creating financial stimulus at the same time. It is now laid down in Council's employment regulations that Superintendents and Assistant Superintendents of Council's Water and Treatment Plants must be in possession of a recognised certificate, thus adding another incentive for the attendants to sit and pass these examinations.

IN-SERVICE TRAINING SCHEME, DEPARTMENT OF WORKS

Towards the end of 1979 it was forecast that a critical situation regarding trained and qualified staff would arise in the Department in 1982 due to resignations and retirement of superintendents and attendants employed on Council's Water and Sewage Treatment Plants.

With the failure of the sub-committee in the Ministry of Water Development to produce an approved scheme for the country as a whole, it was decided that plans for an in-service training scheme be made within the Department. This scheme got off the ground in 1981 when Council agreed to increase the establishment in the Water and Sewerage Branch of the Department of Works by fifteen posts, Grade 22, to be used solely for the purpose of training.

SELECTION TESTS

Because of the lack of skilled mechanical artisans, the entire scheme was based on the training of existing operators and labourers to bring up to the standard of attendants' training and certification those who proved to be capable. Throughout the works there were over four hundred employees and the selection of those capable of advancing themselves proved to be extremely difficult, so it was decided that every one of these employees should be given a chance. Selection tests based on basic mathematics, basic use of tools and a simple aptitude test were devised and these were given to all workers on 30th June, 1981. 150 marks were awarded for this series of tests and those obtaining 70 marks or over were selected to participate in the Part 1 of the actual In-Service Training Scheme. Although 21 candidates obtained the necessary number of marks, i.e. approximately 5,0%, it was felt that the number to be trained was enough for the first part of the exercise, as everything being done was purely experimental, no qualified training officer in this field being available. Also, under these circumstances those selected were considered to have the ability to be trained at a faster rate.

At this stage no advice could be obtained as to what subjects should be on the syllabus for Part 1 of this training. Past experience with the training, examination and certification of attendants had shown that the weakest points of even the most skilled artisan had been mathematics, chemistry and biology. It was therefore decided that Part 1 of the training would consist of these subjects, thus enabling successful candidates of the In-Service Training Scheme as a whole to be better prepared for examinations in the future. Suitable lectures in these subjects were prepared and issued to the selected candidates. At this stage the scheme was in danger of falling into difficulties because of a rapid loss of trained staff in the Department over a short period and candidates could not be given the amount of tuition intended. To their credit, the students continued the course, receiving tuition in a very haphazard manner.

Examinations for Part 1 of the training were held in February, 1982, and those obtaining an average of over 45% were selected to participate in Part 2 of the training scheme. Nine candidates were successful, representing 42,8% of those who participated in Part 1 of the scheme, and approximately 2,5% of the total work force. The nine successful candidates were immediately upgraded to Grade 22 and withdrawn from their normal duties to commence intensive training in Part 2 of the above scheme. At this stage it was realised that it would be impossible to carry out the training as envisaged without the assistance of a training officer. The Department was fortunate in obtaining the services of a retired sewage works superintendent to assist with the training. The syllabus drawn up for Part 2 of the training was as follows:-

Unity Operation (Theory); First Aid; Unit Operation (Practical); Sources of Water; Workshop Practice; Characteristics of water; Applied Mathematics; Trade Effluent Control; Applied Chemistry; Water Cycle; Applied Biology; Safety.

As can be seen, this part of the training laid emphasis on practical training.

Every student was asked to operate each unit on a sewage or water works ranging from raking screens to anaerobic digester control and from chemical dosing to pump-house control respectively for at least two months. At the same time they were given lectures on the theory of each unit. Lectures and practical training were also given on the other subjects on the syllabus. Because of the ability and aptitude of the students, the assistance given by a person with a practical bent, and taking into account the worsening situation of certified attendants on the works, Part 2 of the training scheme was conducted intensively and final examinations in all subjects were carried out in December, 1982. During the training period one of the students dropped out because of illness, but of the eight who sat the examinations seven were successful, representing 87,5% of those who participated in Part 2 of the scheme and approximately 1,75% of the total work force. Three of the candidates obtained over 70%, thus gaining First Class Passes, which was a very pleasing feature of the training scheme.

Certificates have been designed by the Dept. for presentation to the successful trainees and a plaque has been designed which will be presented to the trainee with the best overall performance.

An interesting aspect of the selection methods and the training scheme is that apart from one trainee, the performance of the trainees participating in the scheme was uniform throughout each section of the scheme, as is shown by the positions of each trainee at the end of each section:-

Trainee	Position Selection Tests	Position Part 1	Position Part 2
A	3	2	1
B	1	1	2
C	5	7	3
D	5	5	4
E	3	3	5
F	6	6	6
G	6	4	7
H	2	8	8

These results confirm that the selection and training methods used in the In-Service Training Scheme were successful and could be used to supply the City with suitably-trained staff to operate water and sewage treatment plants efficiently in the forseeable future. The seven successful candidates will be upgraded to Grade 18 and should be able to carry out the duties of a works attendant. They will be encouraged to study for certification examinations with the Institute of Water Pollution Control in the case of sewage works attendants, and with a recognised institute (the matter is currently being negotiated) in the case of waterworks attendants.

THOUGHTS FOR THE FUTURE

Now that the first part of the In-Service Training Scheme has been successfully completed, it is the intention of the Department to look again at the employees who scored between 60 and 70 marks in the original selection tests. Already the lectures have been distributed to fifty-six employees who obtained the above marks. It has been found necessary to move this second phase of training at a much slower pace, and the training officer has given them more lecturing and coaching than the first group.

This phase 2 of the training scheme is now in progress and it is hoped to examine the new Part 1 candidates sometime in January or February, 1983, and repeat Part 2 of the scheme with the successful candidates.

After the second phase has been completed it is felt that the source of material in the Department capable of being trained to this level will have been exhausted. In this event consideration will be given to advertising training posts within the Department so that training in this field will become a continuing exercise, thus providing the City Council and even the entire country with a pool of trained and qualified attendants and operators.

CONCLUSION

Because of the difficulties experienced in obtaining the services of skilled artisans as sewage and waterworks attendants and because of the failure to establish a national training scheme in 1978, the Department of Works in the City of Harare decided to establish its own In-Service Training Scheme designed to produce its own skilled manpower so that capital expenditure spent in the past and that to be spent in the future will be protected by efficient operation of Council's sewage and water treatment plants.

Although some difficulties have been experienced it is felt that the scheme has been successful, and because of it it is hoped that the citizens of Harare will continue to receive a safe supply of water for both domestic and industrial use and that all waste water produced by the City will receive efficient treatment and that a healthy environment will be maintained within the City.

ACKNOWLEDGEMENT

Thanks is given to the Director of Works and the City Council of Harare for assistance in the formation of the In-Service Training Scheme and for permission to present this paper.