

ACTIVITIES OF THE TRAINING DIVISION OF THE SMRI — A SEVENTEEN YEAR REVIEW

By H. F. WIEHE
Sugar Milling Research Institute

Abstract

The formal training of sugar technologists in South Africa by the SMRI since 1964 is fully discussed. The other activities of the Training Division such as the organisation of colloquia and the presentation of courses in sugar technology for engineers are also covered.

Introduction

This paper aims at reviewing the training activities of the SMRI over the past seventeen years. These activities comprise:

1. The formal training of sugar technologists.
2. The organisation of an on-going series of colloquia on a variety of subjects of technical interest.
3. The intermittent presentation of short introductory courses in sugar technology for engineers.
4. Lectures in sugar technology at Natal University as an optional course in the Department of Applied Chemistry.

As the formal training of sugar technologists has been the major task of the Training Division over the years this aspect will be fully discussed first and then the other activities will be mentioned.

Formal training of sugar technologists

In 1964 the Sugar Milling Research Institute undertook, on behalf of the South African Sugar Millers' Association, the responsibility of organising and implementing the training of South African sugar technologists under a centralised scheme. Such a system has the advantage of providing better control over the students and ensuring the uniformity of their practical training at sugar mills.

The aim of the course is to provide the manufacturing sector of the sugar industry with properly trained technologists who will eventually rise to managerial positions.

Organisation, Recruitment and Employment

The course is run in collaboration with three institutions for higher technical education, namely, Mangosuthu Technikon, M.L. Sultan Technikon and Technikon Natal.

Careful screening is exercised in the selection of recruits and one of the enrolment qualifications is the possession of a Senior Certificate with good passes in mathematics and physical science at the higher grade. Candidates enrolling at Mangosuthu are employed and sponsored by individual milling companies. Students registering at the other two colleges are recruited and employed by the SMRI for the duration of their studies.

Conditions of service have to be made attractive enough to compete with other industries and to draw good calibre trainees. Students employed by the SMRI are paid a monthly salary which is revised annually subject to satisfactory progress. All college fees are paid by the SMRI and text books are provided on a loan basis. The trainee also receives an accommodation subsidy together with an annual bonus of one month's salary.

Course Curriculum and Syllabi

The courses are conducted on a full time sandwich basis, 50% of the time being devoted to theoretical studies at college and 50% to practical training at sugar factories.

With such a scheme the trainee is given every opportunity to see and apply in practice what has been learned in class. Over the years several modifications have been made to the course structure and curriculum in order to cope with the changing needs of the sugar industry and the requirements of the Department of National Education.

One such major alteration to the course constitution has been the rearrangement of the curriculum in such a way that after two years of successful study a National Certificate in Sugar Technology can be issued. A further year of study leads to the award of the National Diploma in Sugar Technology. The certificate level course is designed to equip trainees with adequate scientific knowledge for positions of Shift Supervisor and Assistant Chemist. The diploma level is aimed at students being trained for senior posts of Chief Chemist, Assistant Process Managers and higher. Students who have completed the first part have, at a later stage, the option of furthering their studies to diploma level.

Full details of the current theory syllabus are presented in Appendix 1. It comprises three phases of 6 months duration each. Many of the basic subjects taught are common to other chemically orientated courses offered at the Technikons. However, the syllabus has purposely been biased heavily towards sugar processing aspects. Thus, as the studies progress, more and more time is devoted to sugar subjects, which form on the whole a heavy component of the total curriculum. A happy compromise has fortunately been reached regarding the balance between the content of the sugar subjects at certificate and diploma levels. Tuition time on sugar subjects for the certificate course represents 66% of that for the diploma.

Particular importance is attached to the type of in-service training students undergo at sugar factories. Since this is organised centrally, they all have to follow a set pattern including laboratory, in-season and off-crop training as illustrated below in Table 1.

Table 1

LABORATORY TRAINING	—	{	Routine laboratory work
		{	Research project
IN-SEASON TRAINING	—	{	Factory layout
		{	Plant operation
OFF-CROP TRAINING	—	{	Detailed plant study
		{	Maintenance work

A detailed programme of work is given to the trainee whose day to day supervision is entrusted to a designated member of the factory staff, usually an Assistant Process Manager. The student is visited on a fortnightly basis by a lecturer-supervisor from the SMRI who assesses the progress of his work, discusses the problems encountered and issues further instructions. In this way the practical training can be effectively controlled from the SMRI.

TABLE 2
Synopsis of sugar technology courses — 1964-1978

Centre	Year	Enrolled	Resigned	Failed	Passed	Pass Rate	
						Including Resignations	Excluding Resignations
Technikon, Natal	1964	24	4	10	10	42%	50%
	1966	13	1	3	9	69%	75%
	1968	15	3	6	6	40%	50%
	1970	12	3	6	3	25%	33%
	1972	12	4	0	8	67%	100%
	1973	12	3	3	6	50%	67%
	1974	10	3	2	5	50%	71%
	1975	4	2	0	2	50%	100%
1978	11	4	0	7	64%	100%	
Total and Average	—	113	27	30	56	50%	65%
M.L. Sultan Technikon	1973	12	1	4	7	58%	64%
	1974	12	2	9	1	8%	10%
	1975	12	6	1	5	42%	83%
	1978	9	3	0	6	66%	100%
Total and Average	—	45	12	14	19	42%	58%

Courses conducted since 1964

Since the SMRI took over the organisation and control of formal sugar technology training in 1964, 13 courses have been held in collaboration with the Technikon Natal and the M.L. Sultan Technikon. Full details of these courses are listed in Table 2. As can be seen from a total enrolment figure of 158, seventy-five graduates were produced. The majority of these proceeded to diploma level, only six stopping at the certificate mark.

Achievements

It is interesting to note that over 70% of all the graduates produced to date from these courses are still employed in the sugar industry in South Africa and adjoining territories.

A detailed breakdown of these graduates is given in the accompanying table, which indicates that, after a few years of service within the Industry, most of the young men now occupy senior positions.

TABLE 3
Survey of sugar technology course graduates, 1981

Current Position Held	Number of Graduates
Mill Manager	3
Process Manager	9
Assistant Process Manager	25
Shift Superintendent	9
Research and Allied Activities	7
TOTAL	53

TABLE 4
Colloquia held since 1972

Date	Topic	Type of Audience	Attendance
August 1972	Milling	Engineers	60
September 1975	Boiling, Crystallisation and Curing of C-masseccuite	Process Staff	70
September 1976	Evaporation and Allied Subjects	Process and Engineering Staff	90
August 1977	Steam Generation	Engineers	40
September 1978	Diffusion	Process and Engineering Staff	70
March 1979	Clarification and Filtration	Process and Engineering Staff	80
October 1979	Time Efficiency and Factory Maintenance	Engineers	60
March 1980	Application of Gas Chromatography to Factory Control	Chemists and Process Staff	80
September 1980	Boiler Feed Water	Chemists, Engineers and Process Staff	90

Other activities

Colloquia

Since 1972 the SMRI has been running colloquia on a regular basis. They are directed at senior Process and Engineering staff and take the form of a fairly detailed technical discussion on a specific topic, which is broken down into different, discrete sections, each introduced by a discussion leader.

A full listing of all the topics covered to date is given in Table 4. The colloquia are of considerable interest to mill staff and have proved to be very successful.

Courses for engineers

Short introductory courses in sugar technology have been offered periodically to recently appointed senior engineering personnel of sugar factories. The courses have been well attended by delegates from a wide cross section of the industry and have been very useful.

Natal University Course

A new six credit course entitled "Introduction to Chemical Process Technology" has, since 1978, been introduced in the Department of Applied Chemistry at Natal University. It is offered to second year chemistry students from July to November. The subject has a strong component of sugar manufacture in the syllabus. The SMRI has been involved in providing lecturing staff as well as organising laboratory practicals and factory visits for the students.

Judging from the high enrolment figures of last two years, this course seems to be gaining popularity.

Conclusions

From its inception in the early sixties, the formal training of sugar technologists has grown to the point where, today, these courses are available at three technical colleges, whilst a sugar technology option is also offered at the local university. There can be no doubt that this course has fulfilled a very vital role in the provision of suitably qualified sugar technologists for the industry.

Appendix 1

Theory syllabus and time allocated to each subject:

PHASE 1	<i>Hours/week</i>
Chemistry WCA1	6
Chemistry (Practical) WCC1 ..	4
Physics WFJ1	8
Mathematics WWE1	5
Chemical Works Organisation and Practice WCE1	4
Sugar Manufacture WSG1	4
	<hr style="width: 10%; margin-left: auto; margin-right: 0;"/>
	31

PHASE 2	
Analytical Chemistry WAG2 ..	4
Chemistry (Practical) WCC2 ..	4
Organic Chemistry WOB2	4
Chemical Plant WCD2	6
Sugar Technology WSF2	7
Sugar Machinery WSD2	6
Factory Control WFA2	2
	<hr style="width: 10%; margin-left: auto; margin-right: 0;"/>
CERTIFICATE LEVEL	33

PHASE 3	
Organic Chemistry WOB3	5
Drawing WTA1	6
Chemical Plant WCD3	8
Chemical Works Organisation and Practice WCE2	4
Sugar Technology WSF3	3
Sugar Machinery WSD3	4
Sugar Cane Husbandry WSE1 ..	3
	<hr style="width: 10%; margin-left: auto; margin-right: 0;"/>
DIPLOMA LEVEL	33