



## REVISED FINAL REPORT

**Developing a new methodology for competency based training courses for shift supervisors in sugar factories: revised final report QUT032**

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## Final Report

### Cover page

SRA project number:	QUT032
SRA Project title:	Developing a new methodology for competency based training courses for shift supervisors in sugar factories
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## **Body of the Report:**

### **Executive Summary:**

The provision of effective training of supervisors and operators is essential if sugar factories are to operate profitably and in an environmentally sustainable and safe manner. The benefits of having supervisor and operator staff with a high level of operational skills are reduced stoppages, increased recovery, improved sugar quality, reduced damage to equipment, and reduced OH&S and environmental impacts.

At times factories experience a high turnover of supervisors and operators and this can make training of new staff an urgent and critical task. Under these circumstances there is a need to develop the skills in new staff in a short period. In order to satisfy this requirement and to increase the knowledge and skills of the operators and supervisors, an improved methodology for training of supervisors and operators is needed.

The method of training of new operators and supervisors in factories has traditionally relied on on-the-job training of the new or inexperienced staff by experienced supervisors and operators, supplemented by courses conducted by contractors such as Sugar Research Institute (SRI). For example SRI provides training for supervisors via intensive three day courses in March/April each year and for operators on a contracted basis. There is clearly a need for staff to be able to undertake training at any time, drawing on the content of on-line courses as required.

It is also clear that the breadth and depth of the operational decisions to be taken by operators and supervisors in factories are going to increase as staff numbers continue to reduce. It is expected that operators will manage their stations (probably larger sections of plant than currently defined) more autonomously, requiring increased collaboration with other operators to manage the whole plant. Increased depth of knowledge will be required of operators and supervisors.

An improved methodology for the training of factory supervisors and operators has been developed by QUT on behalf of a syndicate of mills. A professional learning consultant, Dr Meredith Godat, was contracted to work with the QUT team to develop the SOTrain package. At the commencement of the project factory staff participated in a series of workshops to help define the content of the modules. Factory staff also reviewed material and provided feedback before its release.

The new methodology provides for 'at factory' learning via self-paced modules which can be undertaken at any time. The modules include notes, guidelines for walkthrough tours of the stations, resources such as videos and competency assessments. The materials are available on the web and many activities are best undertaken on-line. Apart from a few interactive assessment questionnaires the material for each module can be downloaded if that better suits the training programs at individual mills. The acronym SOTrain (Supervisor and Operator Training) has been applied to the new training program.

Eight modules have been developed and are available on the web and are downloadable for use by mill staff for training of supervisors and operators.

The newly developed training system should produce supervisors of higher calibre, and with a higher degree of job and career satisfaction. Factories will benefit from the increased skill level of supervisory and operational staff and through a longer commitment by these key staff to the industry.

### **Background:**

The technical training of supervisors and operators in sugar factories largely relies on on-the-job training, possibly supplemented by the provision of intensive training courses that are held infrequently. Improved training of supervisors and operators will lead to improved decision making by supervisors and operators. These benefits will boost the profitability and environmental sustainability of factories.

At times factories experience a high turnover of supervisors and operators and this can make training of new staff an urgent and critical task. Under these circumstances there is a need to develop the skills in staff in a short period. In order to satisfy this requirement an improved methodology for training of supervisors and operators is needed. This project has developed learning materials to provide the necessary resources which are available on the web and so can be accessed at any time.

### **Objectives:**

As stated in the project application, this project aimed to build the capacity of factory supervisors to make improved decisions through the development of a new self-paced learning program. The objectives of the project to achieve this outcome included:-

- Develop novel workplace training programs for sugar factory operations based on new integrated learning methodologies;
- Develop the delivery protocols which include web based training and group communication;
- Undertake a pilot training program using the new course and delivery systems;
- Evaluate the effectiveness of the work-integrated learning approach in developing the skills of the shift supervisors;
- Refine the training materials based on feedback from the pilot training program; and
- Demonstrate the benefits of the new learning methodology in comparison with the previous method of delivery.

The above objectives were provided in the original project application. At the commencement of the project, SRDC and the mills requested that the project be extended to provide training materials suitable for operators as well. This increased the scope substantially and changes to the objectives resulted. No formal pilot training program was undertaken. As well, the benefits from the new training methodology were not able to be assessed or demonstrated within the timeframe of the project. These assessments will only be possible after the modules have been used by mills for at least a year. A system has been developed to monitor the effectiveness of SOTrain in improving the skills of supervisors and operators.

## **Methodology:**

The following procedures were adopted in undertaking the project.

1. At the commencement of the project a professional learning consultant, Dr Meredith Godat, was contracted to work with the QUT team to develop the SOTrain package.
2. Workshops were conducted in each of the cane growing regions and with individual mills (11 workshops in total) to meet with production managers, supervisors and operators to determine the main requirements for the training package. These discussions determined that 8 technical modules which are suitable for supervisor and operator training would be developed. One of the modules was to be an “Introduction to sugar factory processing”.
3. Several committees were formed with milling staff. These included:-
  - a. A Project Reference Group. This group oversaw the project and in particular advise on the mechanism by which mills would use the modules.
  - b. A Module Reference Group. This group assisted QUT staff in developing the outline for the content of each module and in reviewing the prepared material.
  - c. Subject Matter Experts. These included factory staff and QUT staff responsible for developing the content of specific modules.
4. High Level Designs were developed for each module. High Level Designs (HLDs) are course planning documents that are used to establish the structure of a module by setting the learning objectives, determining the breakdown into suitable topics and sub-topics to ensure the required content is provided, deciding on suitable learning tasks, activities and resources, and competency assessments for ensuring learning acquisition of both practical skills and knowledge retention. HLDs were prepared for each module in sessions involving factory and QUT Subject Matter Experts and the learning consultant.
5. QUT staff prepared the material for each module with the assistance of Subject Matter Experts from mills. The extent to which the Module Reference Group and Subject Matter Experts from mills were involved in the development and review of materials varied substantially among the modules. The project task was much greater than budgeted and the amount of work involved delayed the completion of the project. For the modules prepared near the end of the project, time and funding did not permit a great deal of direct involvement of milling staff in the development or review process.

The Project Reference Group reviewed the module ‘Introduction to sugar factory processing’ which was the first module completed. This provided guidance on the method of delivery and content.

When each module was released and placed on the web (using the QUT Blackboard platform), milling staff were advised through a newsletter that access was available. Feedback from mill staff was sought and often obtained. The project team managed the administration of the web access and the registration process for Trainees and Trainers. For each module, Trainer material was prepared to assist those whose role it is to train the Trainees.

The management of the registration process has evolved through the course of the project. The system which is being used is for each milling group or company to have a Site Coordinator who is responsible for managing the registrations for the milling staff at their site and liaising with QUT staff for the administration of access, and to assist mill employees through registration and access issues.

A formal evaluation procedure has been developed which will survey the milling staff on a yearly basis to determine the extent of usage of the SOTrain modules in training and the effectiveness of the modules in the overall skills development of supervisors and operators.

### **Outputs:**

The project has delivered eight modules as listed below:

1. Introduction to sugar factory processing
2. Overview of sugar factory operations
3. Steam and power generation
4. Extraction
5. Clarification and mud filtration
6. Juice heating and evaporation
7. Pan boiling
8. Fugalling and sugar drying

These modules provide 'at factory' learning via self-paced modules which can be undertaken at any time. The modules include notes, guidelines for walkthrough tours of the stations, resources such as videos and competency assessments. The materials are available on the web and many activities are best undertaken on line. Apart from a few interactive assessment questionnaires the material for each module can be downloaded if that better suits the training program at individual mills.

### **Intellectual Property and Confidentiality:**

No patent applications have been lodged to protect the intellectual property arising from the project. The outputs of the project are confidential to the syndicate members for 6 years from the date of submission of the final report. The list of syndicate members is provided on page 1. QUT owns the intellectual property generated in the project.

### **Environmental and Social Impacts:**

No adverse environmental impacts have occurred during the conduct of the project and none will result from mills implementing the outputs from this project. One of the outcomes of the project should be increased skills of operators and supervisors in better managing potential environmental impacts.

### **Expected Outcomes:**

The main outcomes from this project are:

- Development of supervisors and operators with greater technical knowledge leading to improved decision making. Outcomes from this benefit include:-
  - increased profitability of mills
  - reduced impact on the environment

- greater awareness of potential risks to personnel and equipment
- Supervisors and operators with greater knowledge and skills, having a higher degree of job and career satisfaction.
- Staff demonstrating a longer term commitment to sugar mill supervision and operation.

### **Future Research Needs:**

In order to ensure that the SOTrain modules continue to service the training needs of mills the materials will need to be continually updated, improved and kept relevant.

It is proposed that mills will pay an annual levy for access to the eight modules. These funds will allow QUT staff to upgrade the content and competency assessments in the modules. Other costs to be covered are access to QUT Blackboard and administration costs for QUT and SRL.

### **Recommendations:**

The success of SOTrain is dependent on wide use of the modules by mill staff and the ongoing feedback to QUT to allow the materials to be continually updated, improved and kept relevant. QUT believes that the two key staff at mills who will determine the future usage and success of SOTrain are:-

- Site Coordinators
- Mill management (e.g. production manager).

### **List of Publications:**

Seminars to report on the progress of this project were provided for SRDC/SRA and the staff of syndicate mills at the 2010, 2011, 2012, 2013 and 2014 Regional Research Seminars.

During the project the following major reports were provided to SRDC and the syndicate mills.

Broadfoot, R. and Godat, M. (2009). Developing a new methodology for competency based training courses for shift supervisors in sugar factories – Program proposal and development plan. SRI Syndicate report 05/09.

Broadfoot, R., Godat, M. and Kent, G. (2010). Developing a new methodology for competency based training courses for shift supervisors in sugar factories. Milestone 3 Progress Report.

A final report on the project titled “Developing a new methodology for competency based training courses for shift supervisors in sugar factories” dated June 2014 is provided to SRA and the syndicate mills as a separate document.