



FINAL REPORT 2015

For Public Release

Part 1 - Summary Details

Please use your TAB key to complete Parts 1 & 2.

CRDC Project Number: CMSE1302

Project Title: Cotton Ginning Training Program

Project Commencement Date: 01/07/2012 **Project Completion Date:** 30/06/2015

CRDC Program: Value Chain

Part 2 – Contact Details

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Signature of Research Provider Representative: _____

Date Submitted: _____

Part 3 – Final Report

(The points below are to be used as a guideline when completing your final report.)

Background

1. Outline the background to the project.

The drought from 2006/07 through 2008/09 seriously impacted the Australian ginning sector. A large number of experienced people left the industry due to the short seasons and having only a handful of gins operating. At the same time there were also losses to the large investment in mining in the decade to 2010. In contrast, the seasons from 2010/11 through 2013/14 were the largest seen in Australia, with all gins in the country working at full capacity with two new large gins added in the southern Murrumbidgee Valley area in 2014/15.

The consequence of drought, the mining boom and then record production years left the industry with limited numbers of skilled and trained ginners, with the consequence that a large number of inexperienced staff were introduced to the industry. One impact of this was that the remaining experienced ginners were stretched across shifts with compromises to the efficiency and effectiveness of gin operations.

This project aimed to address two aspects associated with the deficit of trained ginners. The first was to provide immediate up skilling of ginners and other workers to breach the significant resource capacity gap that, at the time (in 2011/12), was having an impact on the cotton supply chain in terms of ginning capacity. This was achieved by partnering with the Australian Cotton Ginners Association (ACGA) and bringing Lummus and Continental (Bajaj Steel) technicians to Australia to train new gin employees for each of the three years of the proposal. The technician(s) conducted courses in each year of the project to teach new and review with existing gin operators aspects of running a gin efficiently and with improved fibre quality.

The second aspect was to develop an Australian ginning course in association with the overseas ginning companies that would meet future workforce requirements. This part of the project involved the ACGA and the vocational training sector rejuvenating the local (Moree) TAFE ginning course.

Objectives

2. List the project objectives and the extent to which these have been achieved.

The broad aims of the project were to:

1. Bring a technician from Lummus and Bajaj Steel to Australia to deliver at least three courses per year to nominated staff from Australian ginning companies.
2. Rewrite and update the ginner's course that was in the past delivered by the TAFE sector and get people from the various ginning companies enrolled to obtain a formal

qualification in ginning. This course would be aligned to the appropriate national training package, with the assistance of the cotton industry's Professional Development Manager Mark Hickman. The vocational alignment would develop an industry skill set appropriate for modern ginning techniques.

Methods

3. Detail the methodology and justify the methodology used. Include any discoveries in methods that may benefit other related research.

A number of phases were identified in the preparation and delivery of the two initiatives.

For the Gin Course using gin manufacturer technicians and extension people:

1. Contact Lummus and Bajaj Steel representatives to contract trainer/expertise.
2. Together with ACGA agree on an outline, duration, attendee numbers and location of the course(s).
3. Promote and advertise the courses.
4. Present courses and obtain feedback from participants. Participants will be required to pay attendance fees.
5. Assess feedback and make any changes to ensure the course satisfies the needs of industry and the participants.

For rejuvenation of the TAFE Program

1. Initiate discussions with registered training organisations (RTO) to assess their willingness to be involved in the developing and presenting of the course.
2. Once an RTO has been selected commence initial discussions on developing and presenting course.
3. Update current course material in association with ACGA.
4. Ensure course is aligned to a national competency.
5. Advertise the course.
6. Present the course and obtain feedback from participants. Participants will be required to pay attendance fees.
7. Assessment of feedback. The course will be assessed to ensure the ginning industry is satisfied with course content and outcomes.

Results

4. Detail and discuss the results for each objective including the statistical analysis of results.

Objective 1: Gin Course using gin manufacturer technicians and extension people

Following approval of this project contact was made with Nicoll Thomson, International Sales Director and the local Australian representative for Lummus Corporation. Following these discussions the Lummus Corporation, due to manpower issues, committed to the presentation of only two courses in February 2013, with the possibility of presenting two further courses in November 2013.

The first (Lummus) course was presented in Dalby QLD from February 18 to 22 at the Dalby RSL. The second course was presented in Moree NSW from February 25 to March 01 at the Moree RSL. These courses consisted of four days of theory followed by one day of practical (onsite at a gin). Practicals were conducted at the Louis Dreyfus Commodities (LDC) gin in Dalby on February 22 and at the North West Ginning (NWG) gin in Moree on March 1. The course outline was agreed to by the ACGA and is attached as Appendix 1. At the time, the two courses scheduled for November 2013 would focus on Continental Eagle equipment and be presented in Warren and Narrabri NSW.

The response by ginning companies to the first courses was overwhelming, and for practical reasons class sizes were limited to 20 participants. In order to give all the various private and corporate ginning companies an opportunity to benefit/participate a decision was taken to ration allocations to the course. It was obviously not possible to satisfy everyone but it was felt that all ACGA members should be provided with the opportunity for at least some of their staff to attend this program.

Table 1 provides a breakdown of the number of participants allocated to each ginning company. The decision by Namoi Cotton Cooperative not to send their staff because their equipment was exclusively Continental Eagle and their management decision to concentrate on maintenance in preparation for the then on coming large season was fortunate.

Table 1. Original allocation per ginning company for February 2013

	Gin Company	Moree	Dalby
1	NWG	2	*
2	Brighann	2	*
3	Koramba	2	*
4	Carroll	*	2
5	North Bourke	*	2
6	Clyde Ag	*	2
7	Tandou	*	2

8	Southern Cotton	2	*
9	Queensland Cotton	4	6
10	LDC	4	6
11	Auscott	4	*
	Total	20	20

The two courses in February 2013 were presented by Mr Alain Pirlot (Technical Services Supervisor) from Lummus Corporation. A full day was spent covering the four most important aspects of ginning process and maintenance i.e., basic air systems, moisture control, principles of hydraulics and maintenance and settings. The cost for attending the course was \$500 per person excluding GST. This included registration fees, morning and afternoon tea, lunch as well as all course material.

Table 2 provides a breakdown of the number of participants from each ginning company that attended the course in February. Due to pressing maintenance issues Koramba Ginning were unable to send their staff to attend so their two places were taken by personnel from NWG and Southern Cotton. Carroll Cotton only sent one staff member although they had been allocated and paid for two places. René van der Sluijs facilitated the course in Dalby and Andrew Vanderstok, in his capacity as ACGA chairman, facilitated the course in Moree.

Table 2. Actual attendance per ginning company for February 2013

	Gin Company	Moree	Dalby
1	NWG	3	*
2	Brighann	2	*
3	Koramba	*	*
4	Carroll	*	1
5	North Bourke	*	2
6	Clyde Ag	*	2
7	Tandou	*	2
8	Southern Cotton	3	*
9	Queensland Cotton	4	6
10	LDC	4	6
11	Auscott	4	*
12	CSIRO	*	1
	Total	20	20

At the end of each day the participants were required to complete a test on the subject matter of the day to ascertain whether the important points covered during the day were grasped and understood.

At the completion of the course participants were presented with a Lummus Corporation certificate of completion. They were also presented with a Lummus Corporation cap and Leatherman. Verbal feedback from the course participants was very positive with all the participants finding the course useful.

Unfortunately the planned courses for November 2013 and January/February 2014, which were to focus on Continental Eagle equipment, did not go ahead as a suitable person, with the necessary knowledge and experience could not be located. This difficulty was associated in part to the change in ownership of the Continental Eagle Company, which was transferred to the Indian company Bajaj Steel in 2012. As well, Lummus Corporation also informed ACGA that the presenter of the courses would not be available due to contracts elsewhere and the commissioning in Australia of two new ginning plants in the Lachlan Valley (Auscott Hay and Rivcott Ginning).

Despite all our efforts in exploring alternatives we unfortunately were not able to locate a suitable person with the necessary knowledge and experience to provide the November 2013 and February 2014 courses. Alternatives that were explored included approaching:

1. Experienced ginner from within gins in the USA.
2. USDA researchers and other institutions.
3. Local Australian Lummus staff and contractors.
4. Bajaj Steel (India) who had taken over Continental Eagle.

Through the local Continental Eagle agents CSIRO made contact with Bajaj Steel Industries Limited, which had acquired Continental Eagle Corporation in 2012 after their closure in 2010 and met with Messrs. David Mrozinski and Shalabh Batra General Manager Sales and Marketing (Exports) during the Australian Cotton Conference in 2014. From this meeting it was agreed to present two courses in November 2014 aimed at ginner with zero to four years experience. The first course was presented in Moree from November 10 to 14 at the Moree RSL with the practical conducted at the Namoi Cotton Cooperative Ashley gin. The second course was presented in Narrabri from November 17 to 21 at the Australian Cotton Research Institute, with the practical conducted at the nearby Auscott Narrabri gin.

To accommodate the ginning companies and contrary to the courses presented in 2013 class sizes were not limited and a total of 58 ginner attended the two courses. Table 3 provides a breakdown of the number of participants from each ginning company that attended the two courses in 2014. René van der Sluijs facilitated the course in Dalby and Andrew Vanderstok, in his capacity as ACGA chairman, facilitated the course in Moree.

The Bajaj Steel course was given over five days and split into four days of theory and one day of practical. The course outline was very comprehensive comprising 29 modules,

which covered all the important aspects of the ginning process as per the course in 2013 but also provided greater general information on classing, safety, contamination etc. Twenty seven of the modules were presented by Mr Stanley Anthony, previously of the USDA ARS Ginning Laboratory at Stoneville MS and now President and Chief Engineer of Enhanced Technologies Incorporated. He was supported by Mr John Kolasky - Director of Engineering at Bajaj ConEagle LLC and Mr V. Shankar General Manager - Projects at Bajaj Steel. The module on hydraulics was presented by Mr Mark Le Roux - National Development Manager, Mining and Filtration at Hydac PTY LTD and the gin controls module was presented by Messrs. Greg Pascall and Clifford Leung from Niatek.

The complete course outline appears in Appendix 2. The cost for attending the course was \$600 per person excluding GST, which included registration fees, morning and afternoon tea, lunch as well as all course material

Table 3. Actual attendance per ginning company for November 2014

	Gin Company	Moree	Narrabri	Total
1	Namoi	11	11	22
2	Auscott	3	10	13
3	Koramba	6	*	6
4	Tandou	2	3	5
5	Carroll	1	3	4
6	NWG	3	*	3
7	Southern Cotton	*	3	3
8	Brighann	2	*	2
9	CSIRO	*	1	1
	Total	28	31	59

The participants were required to complete an exam with 80 questions on the various modules covered to ascertain whether the important points covered were grasped and understood. Figure 1 gives an overview of the exam results for the participants by gin school.

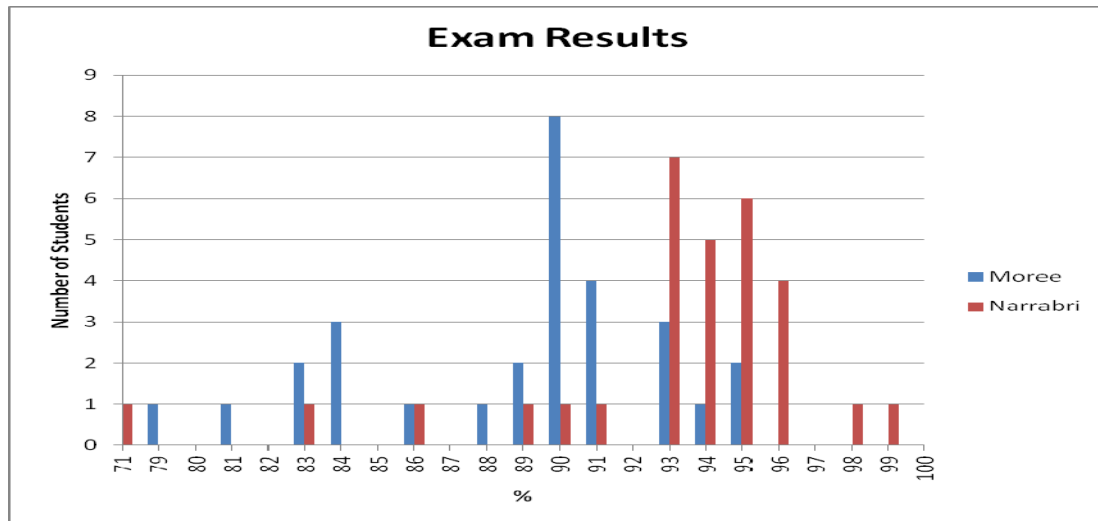


Figure 1 – Student exam results for 2014 by location

As can be seen in Figure 1, all participants did well in the exam, with the results ranging from 71% to 99%. The results for the school in Moree ranged from 79% to 95%, with an average of 87% and a mode of 90%. The results for the school in Narrabri ranged from 71% to 99%, with an average of 93% and a mode of 93%.

At the completion of the course participants were presented with a Bajaj ConEagle certificate of completion and a Bajaj ConEagle T-shirt. Feedback from the course participants was very positive. Figure 2 gives an overview of the overall feedback by each gin school.

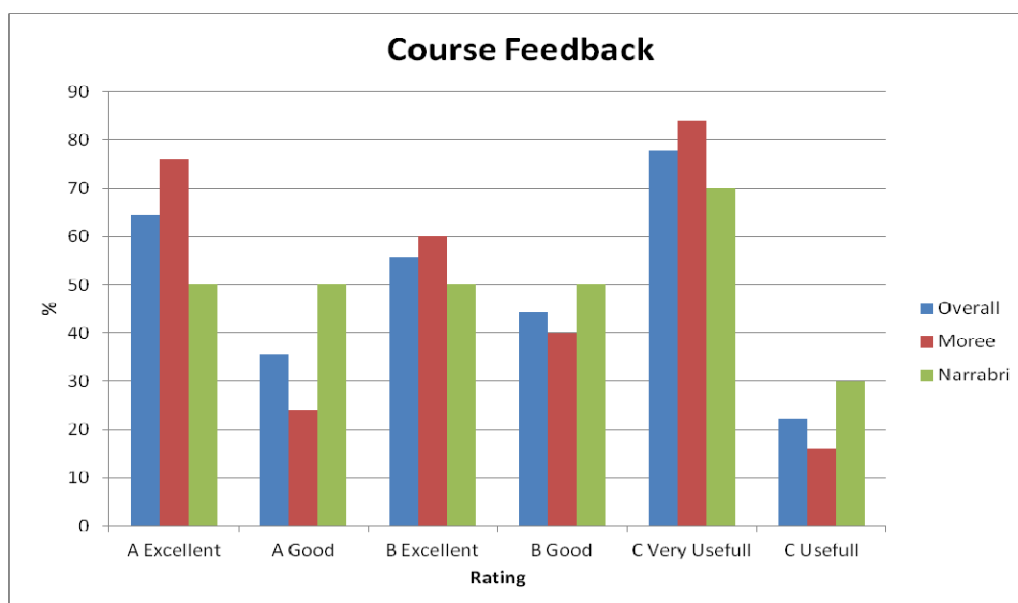


Figure 2 – Student feedback for 2014.

Legend: A- course content; B- delivery; C- support materials

As can be seen all participants rated the schools highly, with 64% of participants rating the course content as 'excellent' and 36% rating the course content as 'good', although there was a substantial difference in the rating between the two schools. Seventy six percent of the participants at the Moree school rated the course content as 'excellent' and 24% rated the course content as 'good', whereas 50% of the participants at the Narrabri school rated the course content as 'excellent' and 50% rated the course content as 'good'.

The participants rated the delivery of the presenters highly, with 56% of all the participants rating the course delivery as 'excellent' and 44% rating the course delivery as 'good', with minimal difference in the rating between the two schools. Sixty percent of the participants at the Moree school rated the course delivery as 'excellent' and 40% rated the course delivery as 'good', whereas 50% of the participants at the Narrabri school rated the course delivery as 'excellent' and 50% rated the course delivery as 'good'.

The participants rated the course support materials (such as video's) highly with 78% of all the participants rating the support materials as 'excellent' and 22% rating the support materials as 'good'. There was a substantial difference in the rating between the two schools. Eighty four percent of the participants at the Moree school rated the support materials as 'excellent' and 16% rated the support materials as 'good' whereas 70% of the participants at the Narrabri school rated the support materials as 'excellent' and 30% rated the support materials as 'good'.

General comments from participants:

It is felt that there are a number of things that can be done to further improve the course and make it more relevant to the Australian ginning industry. For example:

- Videos need to be updated.
- The module 'Electricity at the Gin', should be given by a local person familiar with Australian electrical regulations and standards.
- The module 'Cotton Classing' should be given by the Cotton Classers Association of Australia.
- The modules 'Contamination' and 'Fibre Quality', should be handled by a local person familiar with the quality of Australian cotton and what our - customers expect.
- The module 'Safety' should be handled by the National Safety Council of Australia or a similar association familiar with Australian regulations.
- The module 'New Technologies' is outdated and needs to be updated.
- The module 'Gin Controls' needs to be revamped, as currently it is seen as a marketing/sales pitch from Naitek.

As indicated previously, it was originally agreed with members of the ACGA that the preferred timing of the gin school would be February/March. However, subsequently the

members of the ACGA indicated that the preferred timing of these courses would be October/November. Bajaj/Continental agreed to present the next two courses September 2015 incorporating the suggestions from the participants where practically possible. Unfortunately due to the small crop, devaluation of the Australian dollar, low numbers (due to the incentive of enrolling ginners in the TAFE ginning course) the proposed gin schools in September 2015 were cancelled.

Objective 2: Rejuvenation of the TAFE Program

Following initial discussions between ACGA and Moree TAFE, who in the past presented Certificate 1 to 4 courses in Ginning, the ACGA was advised to submit an application for further funding to the National Workforce Development Fund (NWDF) to assist in funding the training and up-skilling of current and future ginning staff. Furthermore the ACGA also decided that, due to the record Australian cotton crops in 2011/12 and 2012/13, which resulted in long ginning seasons with little or no time for maintenance, the ginning school conducted by US trainers would have precedence over the TAFE certification course for Ginning which would be suspended until June 2013.

Unfortunately the application for further funding to the NWDF was unsuccessful as the change of the government this fund was withdrawn. In the meantime through Janelle McCosker the Business Relationship Consultant for the New England TAFE (TNE) Andrew Vanderstok and René van der Sluijs met with Leon Drury (Executive Officer - Manufacturing Skills Australia (MSA), NSW), Leanne Hixon (Manager - Gateway to Schools QLD) and Janelle McCosker (TNE) at the 2012 Australian Cotton Conference to discuss the rejuvenation of the gin certificate course. From this meeting it became clear that the ACGA would need to collaborate with all the above institutions in our quest to rejuvenate the TAFE course.

During the ACGA Annual General Meeting in February 2015, members of the ACGA met with John Michael (Director –Educational Services, Trades & Primary Industry TNE), Fraser Nelson (Industry Liaison Officer- MSA), Leon Drury (MSA NSW), Leanne Hixon (QMI Solutions) and Janelle McCosker (TNE) to discuss the way forward and agree on action points. We were informed that although the Certificate for Cotton Ginning was currently not on the NSW Skills List, it was however available in QLD and gins with a QLD residential address or employment address were encouraged to sign up their staff before the end of June 2015. This would allow them to access User Choice funding in QLD. This funding allows anyone undertaking the training in QLD to access funding which will subsidise training. Once TAFE confirmed the administration process for sign ups, two ginning companies (Queensland Cotton (Olam) and Namoi Cotton Cooperative) enrolled 14 staff. The ACGA was encouraged to nominate three to four representatives to form Cotton Ginning Industry Resource Development Group (RDG) to:

- Review and identify gin units/resources/assessments for development and advise TNE.
- Identify timing of delivery.
- Recognition of Prior Learning (RPL) process - selection of units that are appropriate for RPL.
- Explore viability of participants being signed up into the Certificate II Engineering qualification in the interim until NSW funding options are explored.

René van der Sluijs (CSIRO Manufacturing), Damian Tonkin (Brighann), Melvyn Kong (Auscott), Shane Towns (Namoi Co-operative) and Noel Woodbury (Manager Educational Capabilities - TNE) were elected to the RDG and to work with the TNE to identify gin units, resources and assessments that needed to be developed for the Cert II, Cert III and Cert IV Cotton Ginning Training Packages. The course structure and units of Competencies to be delivered have been identified and specific team members have been identified to develop agreed cotton ginning resources.

- Damian Tonkin and Melvyn Kong – Unit - LMTCG2002A Ginning cotton.
- Shane Towns – Unit - LMTCG2003A Control bale or mote press operations and LMTCG3003A - assist in overhauling or repairing cotton ginning fluid power equipment.
- René van der Sluijs – Unit - LMTCG2001A Identify cotton characteristics and Unit LMTCG3001A Identify factors that impact on cotton quality.
- Unit - LMTCG3002A Perform advanced operational maintenance of cotton ginning machines and equipment, will be developed last.
- The Cotton Ginners Handbook has been identified as the required textbook for all the ginning units. Fifty copies were sourced by René from the USDA free of charge with TNE paying the shipping costs.
- All Ginning Maintenance and Fabrication units selected for this course have delivery and assessment resources developed.
- A RPL tool has been developed to identify gap training for the engineering units.
- TNE will contact the NSW Government's Department of Industry to add the Certificate for Cotton Ginning to the NSW Skills List for 2016.

The timeframes agreed for the development of the ginning units are as follows:

Cotton Ginning Training Resources to be completed	End of 2015
Cotton Ginning Assessments	To commence in 2016

As Registered Training Organisations (RTO) are responsible for developing the course materials, TNE committed approximately \$25,500 to review the materials developed by the team member above and to develop the learning resources and assessments. The

assistance of Mark Hickman was not required, besides which his move to a management role within QLD Agri-Science Department of Employment, Economic Development and Innovation would have made it difficult for Mark to contribute to this project.

Outcomes

5. Describe how the project's outputs will contribute to the planned outcomes identified in the project application. Describe the planned outcomes achieved to date.

This training program sought to provide staff in the cotton ginning industry opportunities to gain valuable information and understanding of the ginning process. The program comprised two initiatives

- a) By partnering with the ACGA to bring skilled technicians from the two major gin manufacturers to Australia with the immediate aim of reducing the significant resource capacity gap that is having impacts on the cotton supply chain.
- b) By partnering with the ACGA to rejuvenate the local TAFE ginning course.

Four training courses were presented in conjunction with Lummus Corporation and Bajaj Steel Industries Limited in 2013 and 2014 to a total of 98 participants. Feedback from the participants was very positive, with the participants rating the course content, support materials and the delivery of the presenters highly.

The process in developing the TAFE Certificate II, III and IV Cotton Ginning units has commenced and is scheduled to be completed by the end of 2015. In the mean time students have been encouraged to enrol and commence with the engineering units, which already have delivery and assessment resources developed. Two ginning companies have enrolled 14 staff in QLD and RPL assessments have been conducted on a further 13 staff. With the successful addition of the Certificate for Cotton Ginning to the NSW Skills List in 2016; five ginning companies enrolled 34 ginners, in NSW.

6. Please describe any:-

- a) technical advances achieved (eg commercially significant developments, patents applied for or granted licenses, etc.);
- b) other information developed from research (eg discoveries in methodology, equipment design, etc.); and
- c) required changes to the Intellectual Property register.

N/A

Conclusion

7. Provide an assessment of the likely impact of the results and conclusions of the research project for the cotton industry. What are the take home messages?

Over the last ten years the Australian cotton industry has suffered through drought and the loss of resources to the mining industry. These have had harsh consequences affecting the size of the resource capacity pool for the industry. This project aimed to rebuild this capacity by providing existing and new staff the opportunity of further training with relevant and current information. The training contributes to the ginning company's ability to provide an optimum service to the grower in maintaining a competitive and efficient ginning sector.

Indications are that the up skilling of existing and future staff through the two initiatives has assisted the ginning industry in coping with the big crops of the last few seasons. These training opportunities have also provided existing staff an added incentive to remain in the industry by giving them the opportunity to develop their skills and assisted in attracting younger people to the industry.

Extension Opportunities

8. Detail a plan for the activities or other steps that may be taken:

- (a) to further develop or to exploit the project technology.**
- (b) for the future presentation and dissemination of the project outcomes.**
- (c) for future research.**

N/A

9. A. List the publications arising from the research project and/or a publication plan.

(NB: Where possible, please provide a copy of any publication/s)

B. Have you developed any online resources and what is the website address?

N/A

Part 4 – Final Report Executive Summary

Provide a one page Summary of your research that is not commercial in confidence, and that can be published on the World Wide Web. Explain the main outcomes of the research and provide contact details for more information. It is important that the Executive Summary highlights concisely the key outputs from the project and, when they are adopted, what this will mean to the cotton industry.

Between 2007/08 and 2009/10 the Australian cotton industry suffered a severe drought which seriously impacted the resources available to the ginning sector. At the same time the higher incomes offered by the mining industry saw a large number of experienced people leave the industry. This resulted in a smaller pool of skilled and trained ginners and the industry being forced to use inexperienced staff to deal with the record crops experienced from 2010/11 through 2013/14.

This project aimed to address the above issue through two initiatives. Firstly to bring technician(s) from Lummus and/or Continental (Bajaj Steel) to Australia to conduct courses to teach/introduce new and existing gin operators to the technical aspects of running a gin efficiently and with improved fibre quality. The second initiative was to rejuvenate the local TAFE ginning courses.

In conjunction with Lummus Corporation two ginning courses were presented in February 2013, with the first course presented in Dalby and the second course presented in Moree. For practical reasons the class sizes were limited with the various ginning companies allocated places. A total of 40 participants attended these courses. In conjunction with Bajaj Steel Industries Limited two further courses were presented in November 2014, with the first course presented in Moree and the second course presented in Narrabri. These courses were aimed at ginners with zero to four years of experience. A total of 58 ginners attended the two courses. Feedback from the participants that attended the four courses was very positive, with the participants rating the course content, support materials (such as videos) and the delivery of the presenter(s) highly.

Unfortunately, the three courses per year could not be offered as originally planned. This was due to a host of issues, such as a shortage of qualified and experienced persons to conduct the required training, the small crops in 2014/15 and 2015/16, devaluation of the Australian dollar and the incentive of enrolling staff into the TAFE Cotton Ginning course.

The process in developing the TAFE Certificate II, III and IV Cotton Ginning units has commenced and is scheduled to be completed by the end of 2015. In the meantime students have been encouraged to enrol and commence with the engineering units which

have delivery and assessment resources developed. Two ginning companies have enrolled 14 staff in QLD and RPL assessments have been conducted on a further 13 staff. With the addition of the Certificate for Cotton Ginning to the NSW Skills List in 2016; five ginning companies enrolled 34 ginners, in NSW.

APPENDIX 1

2013 - COTTON GINNING SCHOOL OUTLINE

Day 1: BASIC AIR SYSTEMS

Definitions
Centrifugal fans
Axial fans
Fan laws and performance changes
Fan curves and system performance
Collectors
Troubleshooting an air system
Recommended air volume flow rates for Lummus machinery

Day 2: MOISTURE CONTROL

Moisture control
Psychrometry
Principles of air humidification
Moisture unit
Drying principles

Day 3: HYDRAULICS PRINCIPLES

General safety	Hydraulic pumps
Hydraulic principles	Hydraulic actuators
How a hydraulic system works	Control valves
	Troubleshooting

Day 4: MAINTENANCE & SETTINGS

Maintenance guidelines
Separator & Vacuum
Tower Drier
Hot Air Cleaner
Stick Machine
TrashMaster
Extractor Feeder
Gin Stand
Lint Cleaner
Battery Condenser
Packaging System

Day 5: ON SITE TRAINING

APPENDIX 2

2014 - COTTON GINNING SCHOOL OUTLINE

DAY 1

1. Overview of Global Cotton Industry
2. Machinery Impact on Fibre Quality
3. Best Ginning Practices
4. Seed Cotton Module Construction, Handling and Storage

Harvesting and storage

5. Air in Cotton Gins

Airflow basics

Air measurements

Air system design

Airflow requirements of gin machinery

Fan tables and curves

6. Moisture

Drying and moisture impact of fibre quality

Moisture management at gins

7. Drying Systems

Proper use of drying systems

Drying basics

Drying heaters

Heater selection and maintenance

Drying systems

8. Moisture Restoration

Moisture restoration in gins

Methods of moisture restoration in gins

9. Seed Cotton Cleaners

10. Gin Stands

11. Lint Cleaners

DAY 2

12. Maintenance Programs

Maintenance program specifics

Maintenance of seed cotton cleaners

Maintenance of gin stands

Maintenance of lint cleaners

13. Review of Functions of Cotton Ginning Systems

14. Bale Packaging

Bale packaging

Press maintenance and bale shapes

15. Hydraulics

Basic Hydraulics

Hydraulics in Australian Gins

DAY 3

16. Waste collection

Waste Collection and Disposal

Cyclone design and maintenance

Controlling emissions
Methods of Waste Utilization and Value
Mote processing
 17. Electricity in the Gin
Basics
Motors
Troubleshooting electrical systems
Billing
Preventative maintenance of motors
Electronics in Australian gins
 18. Cotton Classing
Cotton classing in the United States
 19. Gin Safety
Creating a safety training program
Safety introduction
Accident reporting and investigation
 20. Increasing gin capacities
 21. Contamination
Contamination of cotton
Contamination prevention
 22. Textile Trends and Processing
 23. Ginning Industry Trends in the U.S.
 24. Gin Fires
 25. Gin Noise
 26. New Technologies
 27. Duties of a Gin Crew
Duties of selected gin personnel
Duties handout
DAY 4
 28. Hydraulics Systems
 29. Gin Controls