

Report on Proof of Concept Project – DRAFT 2

TCI Hemp Technology

Processing From Field to Fibre.

Demonstration Date: Friday 18th March 2011

19/3/11 by Adrian Francis K. Clarke.

Summary: On Wednesday 16/3/2011 Hemp stems were gathered from the Commins Farm near Griffith in NSW, stored in plastic, and brought to the engineers, Agware, in Ballarat on Friday 18/3/2011. The green fresh hemp stems were processed through the TCI decortication technology. The hurd was removed from the fibrous bark by the TCI decortication technology. The Bark (or Bast) was taken immediately to Deakin University where it was degummed in another TCI technology and prepared to the stage of being opened and carded and spun in standard cotton systems. The time of actual processing activity of this sample from Field standing green stems to fibre ready for Cotton systems was only approximately 3 hours.

Acknowledgements

The TCI Team would like to express its gratitude and appreciation to all those who assisting in making this demonstration possible.

Those people include:

Patrick Callabria, plant breeder, for making a variety of hemp which is still viable in the very late part of , and well beyond, the normal hemp growing season.

Roger and Tim Commins for their generosity in giving us virtually free access to their hemp crop.

Peter Myer and Greg Williams of Agware Pty. Ltd. Agricultural Engineers for their unstinting support in the development and commercialisation of the technology and especially for preparing the machines for this demonstration project.

Chris Hurren of Deakin University in Geelong for his unflagging support, expertise, advice and demonstration of the degumming of the fresh green skin decorticated earlier in the day at Ballarat.

Cesare Corgatelli, textile industry consultant, for being a witness to credit that we have the technology we have claimed to have which can take hemp from the field and prepare it for cotton processing in a few hours.

David Giles-Kaye for witnessing the process and proof of concept on behalf of his company, Logistic Unicorp of Canada, and his CEO Louise Bibeau.

Dominik Vogt, European Industrial Hemp Association – EIHA, who provided the TCI document “The Terrible Truth About Hemp” to Louise Bibeau in order to effect an introduction between Louise and TCI

The TCI team included: Adrian Francis Clarke, Frank Urban, Jeordy Clarke, Tony Clarke, and Oliver Hooks.

Diary and Timeline of the day Friday 18/3/2011:

During late February and early March 2011 the small prototype decortication machine known as the D7 was taken to Agware Agricultural Engineers in Ballarat to be repaired and to have a new conveyor system installed. It was made ready for work. Also an earlier decorticator prototype known as the D6 was prepared at Ballan.

Wednesday 16/3/2011. Frank Urban drove to the Commins Farm in NSW and collected the stems. He collected approximately 10 Kg of green unretted stems, from the growing crop, drove back to his home in Chadstone and secured the car load ready for its next trip to Ballarat for processing.



(16/3/11 photo of Crop from Frank Urban)

The crop is a late season self sown crop which grew in 6 foot wide beds and which had been irrigated by flood irrigation. It is very subject to edge effect with branching etc. It is also an 'out of season' crop which therefore did not reach the height it would have had it been planted in the normal hemp planting time of between September and December for harvesting between 70 and 100 days of growth. Being such a late crop, an edge effected crop and a mature crop it also developed a very hard hurd.

On **Friday 18/3/2011** Frank Urban collected Adrian Francis Clarke, Tony Clarke, Jeordy Clarke and Oliver Hooks. In two cars the team proceeded to Agware's factory in Wendouree, Ballarat where they arrived at about 8.30 am. Frank Urban also towed the trailer mounted D6 machine from Ballan to Agware so that there would be two decorticators at the site if needed.

Note: the D6 was designed and built to produce hemp fibre skins from end to end of the stem so that the skin could be gathered for processing in the old long-line systems for tradition flax and hemp linen spinning. The D7 was designed and made when degumming systems had been developed which rendered the fibre able to be spun in standard cotton systems. The D6 system will be retained for making long ribbons of hemp for the vast handcraft industries, which weave hats and screens etc., as well as those who have asked for it to replace fibreglass for binding bamboo bikes.

The Two decorticators were started and checked for safety and performance by Adrian Clarke and Agware engineers and briefly run to ensure they were ready for the demonstration project.

Cesare Corgitelli, an internationally recognised textile marketing personality and former consultant to Sandong Rhui of China, arrived at around 9.30 a.m. to witness the demonstration project.

David Giles – Kaye, the Australian Representative for the Canadian Company, Logistic Unicorp, which is internationally renowned for uniform production, arrived at around 10.00 a.m. to witness and record the demonstration of the TCI technology on video for his CEO. Note that Louise Bibeau was to attend in person but urgent business matters required his presence in France.

At approximately 10.30 am the 10 Kg of stem was fed into the D7 decorticator and the process filmed by David Giles-Kaye and also separately videoed by our own team.

The approximately 10 Kg took only a few minutes to be fed into the D7 mini decorticator by Adrian Clarke. The speed of processing was limited by the speed at which the stems could be fed into the small aperture of the machine.

Approximately 2.5 Kg of Green Fibrous Skin was recovered.

Approximately 7.5 Kg of green Hurd was recovered.

The 25% yield of green skin output to green stem input is consistent with many European hemp varieties.

It should be noted that the commercial sized D8 version of the D7 machine is a metre wide and is designed to be inserted into a harvester and to process a hectare of green fresh standing hemp per hour. That would mean an output rate of approximately 6.5 to 7 tonnes of hurd and 2.5 to 3 tonnes of fibre in an average hemp field. The D8 has been field tested and designs for a harvesting decorticator prepared. Static versions of the D8 have been proven to be able to process hemp from Role Bales and from straight stooks in high volume.

The green sap-wet fibrous hemp skins were gathered and the separated hurd chips were also gathered in a separate bag.

The participants then went to their cars for the journey from Agware at Ballarat to Deakin University at Geelong; approximately 100 Km to the south.

The team then assembled at Deakin University a little before 1.00 pm and were met by Dr. Chris Hurren of the Institute for Technology Research & Innovation, Deakin University.

A little after 1.00 pm Dr. Chris Hurren took the observers into the laboratory where he placed the decorticated green fresh fibrous hemp skin into the Kier Dye works basket/receptacle, filled it with water, added chemicals and set the system going.

After approximately 2 hours of Kier processing the observer team re-assembled to see the end of the Kier step in degumming. The fibrous skin material was removed from the Kier basket and Dr. Chris Hurren took it to a pad roller where it was squeezed and (in another room) rinsed. This squeezing and rinsing was done three times and the fibre was then dried.

At this stage the vivid green colour was greatly reduced and the individual fibres began to separate.

The plan had been to immediately take this fibre to the cotton system opener and cotton system card, however, due to circumstances beyond our control those machines were in storage and not powered for this final step using standard cotton machines to complete the transformation from Field to open carded fibre. That step will be completed next Thursday 24/3/11 when power will have been supplied to the machines.

Dr. Chris Hurren then took the team to his office where he showed material that had been processed in the same manner in earlier projects to develop the system based upon the TCI decortication technology.

Future Action for finalising Demonstration Project:

Thursday 24/3/11, Dr. Chris Hurren will open and card the fibre processed from field, through decorticator, through Kier degumming, to dry stage on Friday 18/3/11. This will be witnessed by Cesare Corgatelli and David Giles-Kaye and filmed by both David Giles-Kaye and Tony Clarke.

COMPLETED

As planned on Thursday 24/3/11, Dr. Chris Hurren completed the Demonstration Project.

The decorticated, degummed dry fibre was processed through the Fearnought Opener and a Card.

The fibre went from its existence as part of a 10 Kg approx. bunch of green growing stems the field, through the separation process of TCI's decortication technology where it became approximately 2.5 Kg of fibre and 7.7 kg of hurd to a ready to spin condition with approximately 3 hours of total processing.

It is clear that a commercial sized process could follow the same steps with commercial quantities of input hemp stem. It is clear that this system is the basis for a viable modern hemp textile industry which can provide an extra fibre source for the massive world-wide cotton spinning industry and thus fill the fibre raw material gap with a fibre that can be used either on its own or as blends.

Dr. Chris Hurren also showed samples made earlier from crops which were grown and harvested under ideal densely-planted conditions correctly "in season" and which were more representative of the usual quality of output from the system when the variables are more favourable. Samples from earlier work supplied to David.

Present that this final demonstration and proof of concept stage were:

David Giles – Kaye

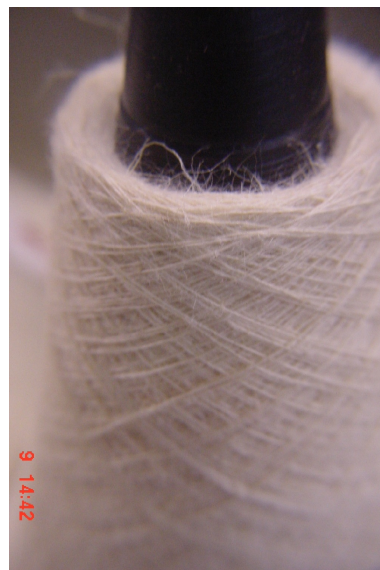
Cesare Corgatelli

Tony Clarke

Both David and Tony videotaped the event.



Output samples from this Proof of Concept. Thursday 24/3/2011.



Ideal Hemp Crop and ring spun sample.