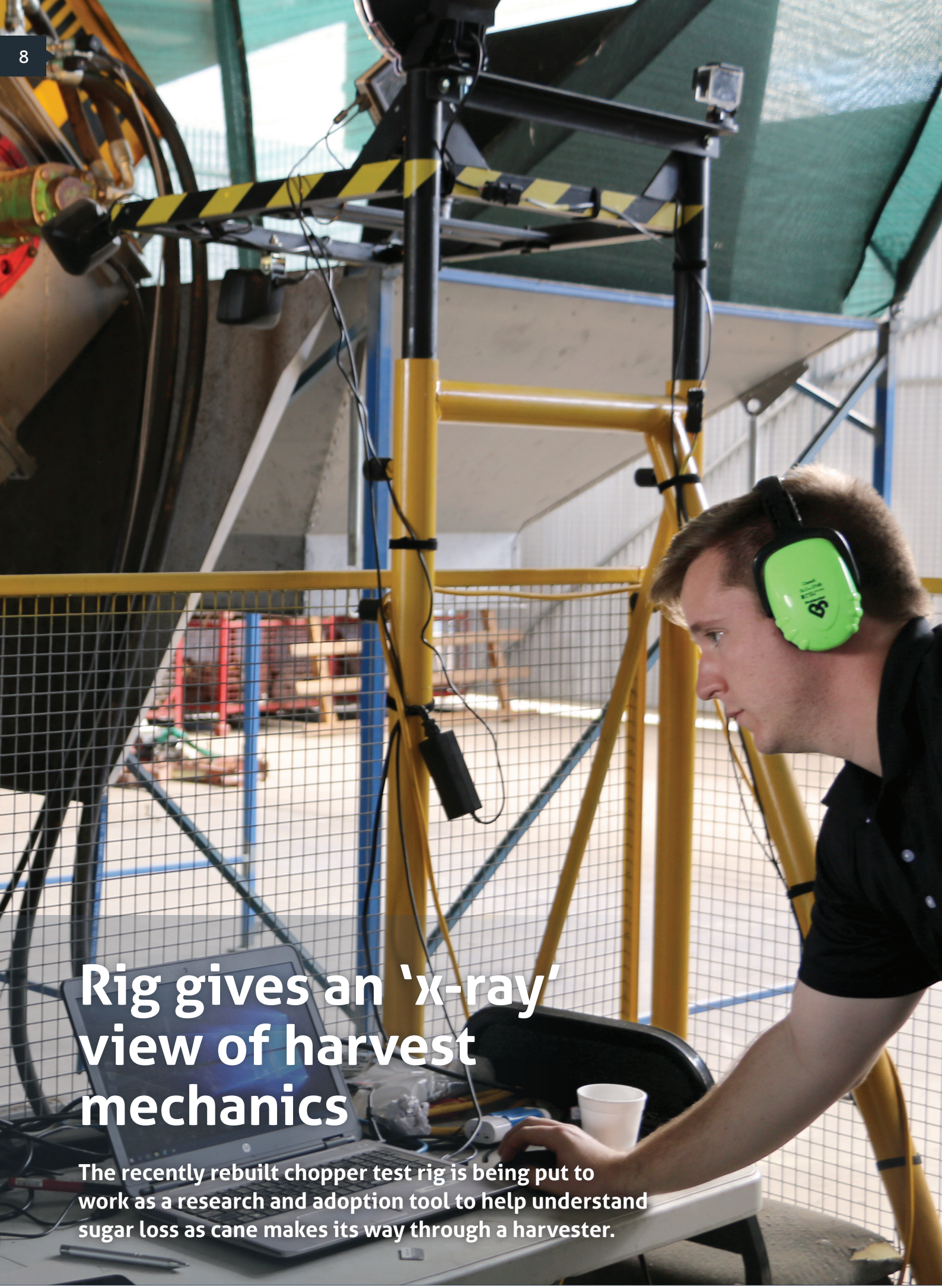

Rig gives an 'x-ray' view of harvest mechanics

The recently rebuilt chopper test rig is being put to work as a research and adoption tool to help understand sugar loss as cane makes its way through a harvester.

It is known as the chopper test rig.

Chances are that you have seen all the components of this machine before – just not in this arrangement – as it is an exact replica of the feedtrain and chopper drums of a modern sugarcane harvester.

The key difference with the chopper test rig is that it is stationary, in a shed, with all the technology attached for replicating and analysing in-field conditions of the internal mechanics of harvesting.

The chopper test rig is not new. It was first put together about 20 years ago by BSES and played an important role for research in the industry at a time when harvesters were still manufactured in Australia.

Fast forward to 2016, and harvester manufacturing had long since moved offshore, and the chopper test rig was gathering dust – and rust – at the SRA Burdekin station.

Under the leadership of SRA Agricultural Engineer Joseph Bonassi, SRA then resurrected the chopper test rig and has now put it to use as a valuable research and adoption tool for the Australian industry.

"We knew that it was too valuable of an asset to not utilise, particularly with the industry's profit margins under such pressure and the strong collaborative effort occurring across the value-chain to reduce cane and juice loss," Joseph explained. "It was a big process putting the jigsaw back together and working with a local Ingham manufacturer to get the rig back up and running, this time with modern equipment and sensors."

The machine has now been running for about 12 months and is used for a range of demonstrations for growers, contractors, and millers, as well as for research under the project Joseph leads, which is called *Increased harvest recovery: reducing sugar loss and stool damage.*

"Everything is hydraulically driven as is the case on a standard harvester, but with multiple circuits driven off different pumps so that we can jump between what comes standard out of the factory and what past research has demonstrated to be optimised, and anywhere in between.

"When new designs or templates come out we can test them to see if different settings suit these designs better, reduce losses and improve how the machine runs."

Trials this season are looking at different types of chopper drums and blade configurations such as four, five or six blades.

Each trial involves a number of replicates totalling about 2.5 tonnes of whole-stalks and trash presented to the test rig such that it replicates in-field conditions. The set-up allows he team to precisely measure how much weight is lost from the cane's passage through the rig, eliminating any variables that come with conducting trials in the field.

They also analyse billet quality, variability, and length, counting sound, damaged, and mutilated billets. Multiple sensors and cameras monitor the cane as it passes through the machine.

This includes a high-speed camera capturing video at 1000 frames per second, showing each cut in extreme slow motion and allowing the team to get a feel for losses that the human eye could never appreciate. This adds a visual demonstration to the data collected through the sensors and weight measurements.

"Photos and video don't do it justice until you stand here and feel the rig shaking the foundations. It is an accurate representation of just how tough a real harvester is.

"We have received good feedback from people who have seen it, with people who have been able to see it up close in a safe environment. It is a good discussion point to see how sticky everything is and to look at the damaged and variable billets."

Further trials this season will also look at issues comparing optimised and un-optimised feedtrains as well as dirt retention.

Joseph said that trials in the past had shown that feedtrain and chopper losses ranged from 2 percent to 8 percent, which presented a valuable opportunity for the Australian industry to recapture value and improve its understanding through tools such as the chopper test rig. ■

To see a video on the rig, visit www.sugarresearch.com.au/sra-information/media/

Contact Joseph Bonassi on
E jbonassi@sugarresearch.com.au

SRA acknowledges the funding contribution from the Queensland Department of Agriculture and Fisheries towards this research activity.

(Over page) *Agricultural Engineer Joseph Bonassi with the chopper test rig.* ***(Above left)*** *The rig in action.* ***(Above)*** *The rig has been fitted with a range of sensors and cameras to precisely measure losses.*