

SNAPSHOT

LAMB FRENCHING

Project Report Reference: 2014_1056

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Project Description

The overall objective of this project is to design, build, develop, install and trial an automated system for french dressing lamb ribs. This will be a prototype system, which will run limited trials at an agreed host site most preferably in Scott NZ Christchurch facilities.

Manual frenching of lamb racks requires skilled knife-work and consumes considerable labour resources. Current commercial frenching solutions (that require reduced labour) result in significant water (and noise) pollution, result in a loss of valuable intercostal meat and produce a waste stream of a lamb stew broth that then requires treatment.

Various companies in the past (including Scott) have attempted to semi-automate or automate the lamb frenching process. Non-water (waterless) developments (by Scott and others) have not been successful due to the application of either tactile or non-x-ray vision systems. They work, however the yield recovery and final presentation is not acceptable.

In this project Scott Automation and Robotics have applied their automation knowhow into developing an automated solution that uses a machine to automatically french lamb racks without the downsides of current water frenching solutions.

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Project Content

It was believed that a loop around a rib, pulled with force, could remove the intercostal meat and leave the rib appropriately clean.



Figure 1: Testing Intercostal Removal Hypothesis

This workshop test was developed into a test mechanism, and ultimately the proof of concept system that was trialled at the host processor site.

The test mechanism used two rows of slotted needles to capture the tensioned braided lines. As the top and bottom rows of needles are pushed towards each other, the tensioned braided lines are pulled through the intercostal, creating a loop around each rib.

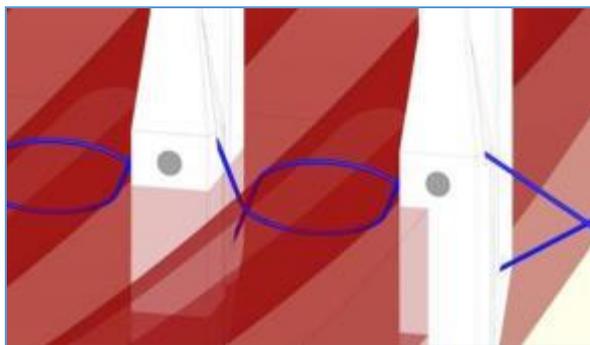


Figure 2: Theoretical Method of Intercostal Removal

Project Outcome

Scott engineers investigated step by step the requirements of the Frenching process, designing of test rigs to mimic those operations, analyzing the results and step by step created an automated prototype solution.

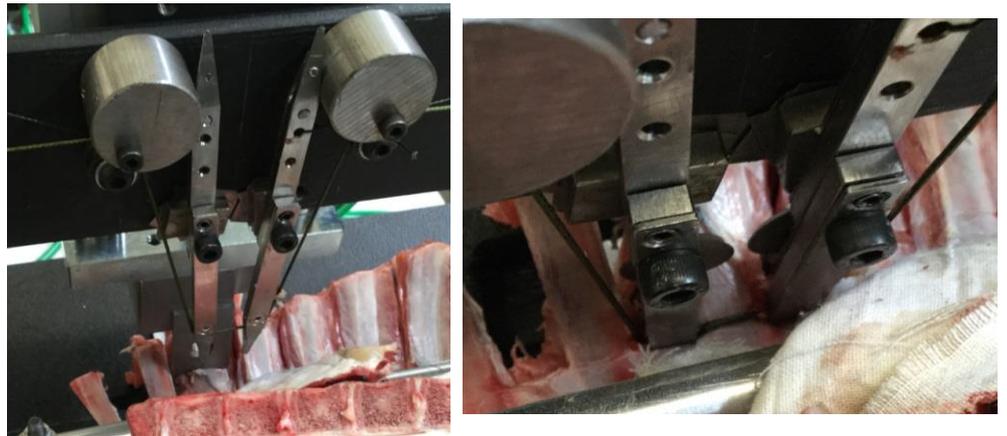


Figure 3: Test Rig used during Mechanical Concept Design

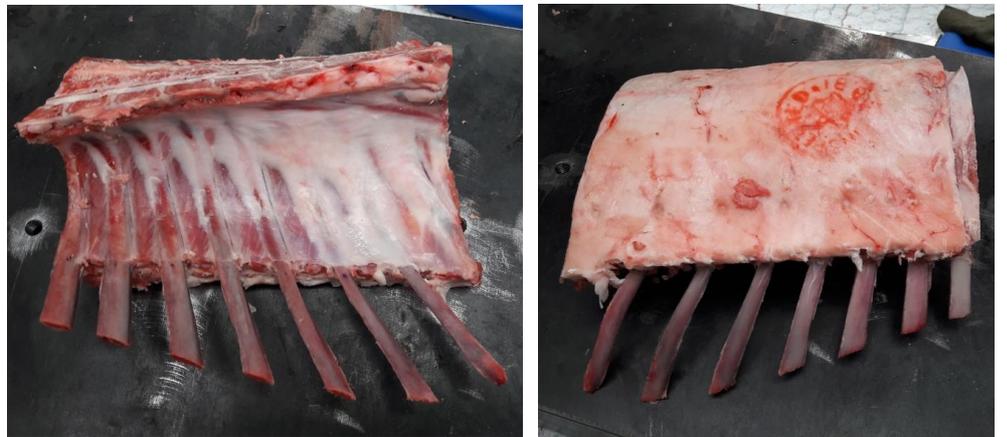


Figure 4: An example of the results achieved with the prototype

Benefit for Industry

At the completion of this project two things have been developed:

- / A primal specific small footprint machine for application to lamb frenching (and possible platform extension to other beef and lamb primal automation in the future).
- / A waterless lamb frenching solution prototype for installation and demonstration within an Australian processing facility.

Whilst the prototype sufficiently demonstrated the proof of concept, there are a number of issues to be considered during the next phase of the project. These include:

- / Meat to be recovered in the form of intercostal
- / System to be designed to handle 10 rack a minute
- / Current rib surface finishing is acceptable but there are some room for improvement
- / Determine durability of the wire, type and material in wire
- / Determine how often the wire needs to be cleaned, introduction of cleansing process for wire to clean up the excess fat, perhaps a bath/hot water tank or a contact/friction/brush cleaning mechanism.
- / Wire change procedure
- / Longevity of rotary blade and sharpness



Figure 5: Final Prototype System



Figure 6: Final Prototype System in operation.

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