

## **milestone report**

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MLA project code:	<b>P.PIP.0403</b>
MLA project title:	<b>JBS Lamb Hindquarter Double Tipping Saw</b>
Project leader:	<b>James Charnley</b>
MLA project manager:	<b>Darryl Heidke</b>
Milestone number:	<b>3</b>

### **Milestone 3**

#### **Complete Build and FAT**

Finalise the build of a fully operational prototype and conduct in house tests by processing lamb hind legs. Implement any improvements to the machine that can be identified during this limited in house testing in preparation for on-site trials.

#### **Abstract**

Factory acceptance trials of the prototype Lamb Hindquarter Double Tipping Saw have been conducted. The machine is able to conduct the 2 necessary cuts rapidly and with good cut quality through the bones. The machine must now be prepared for trials in a food processing environment, this involves designing and installing comprehensive guarding and safety systems, electrical and control systems and cut locating mechanisms.

#### **Project objectives**

This project aims to develop a 'bolt on' bandsaw attachment solution for lamb hind leg tipping that will:

1. Improve operator safety,
2. Assist the operator to achieve improved yield, and
3. Maintain throughput capacity.

## Success in achieving milestone

The build of the operational prototype was completed and the factory acceptance tests were carried out using lamb hind legs. During these trials the Lamb Hindquarter Double Tipping Saw (LDTs) was able to conduct the 2 necessary cuts in rapid succession and good quality cuts were achieved as can be seen in Figure 1 and Figure 2 below.

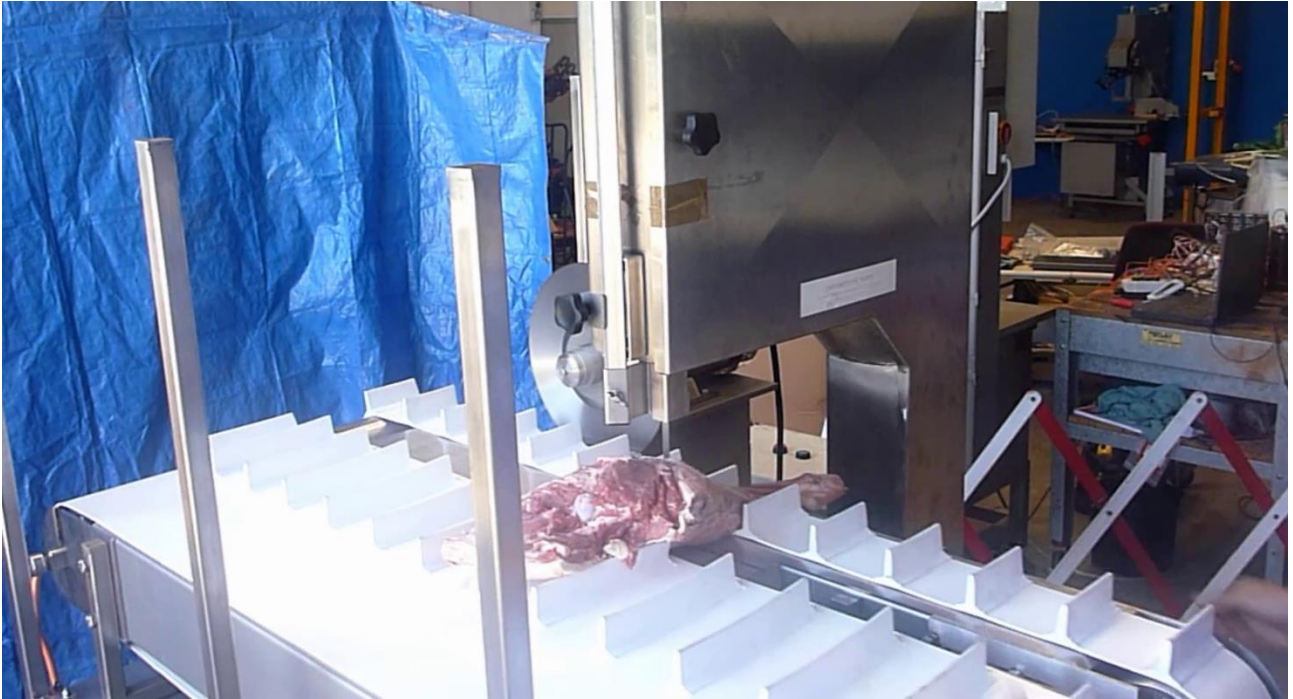


*Figure 1: Cut at knee joint/knuckle*

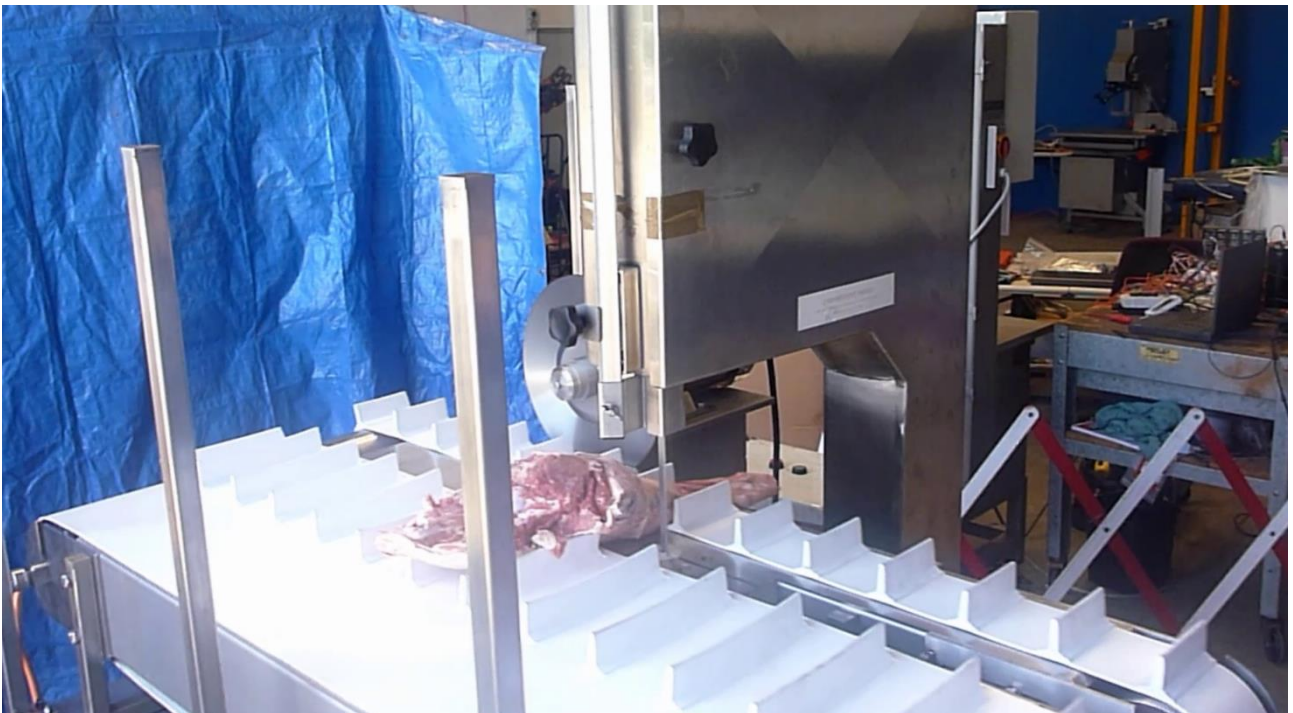


*Figure 2: Cut at shin*

Figure 3 through Figure 5 are snapshots of a lamb hind leg being processed on the LDTs:



*Figure 3: Product seen before the bandsaw cut stage*



*Figure 4: Product seen between the bandsaw cut and the circular saw cut stages*



*Figure 5: Product seen with both cuts completed, still on the conveyor and with tip ejection in progress*

Figure 6 below is a finished product from a later run.



*Figure 6: Finished product from a later run*

Observations of the machine's performance, as well as additional actions to be taken are listed below.

Observations	Actions
<p>The conveyor belt component of the machine operates well.</p> <ul style="list-style-type: none"> <li>The belts track well, however as the belts are not identical, they will elongate at different rates as they age making synchronisation more difficult.</li> <li>Belt speed is adjustable via the VSD but will not be adjustable by the operator mid production.</li> </ul>	<ul style="list-style-type: none"> <li>Integrate the conveyor belt electrical system into the bandsaw.</li> <li>Integrate the conveyor belt control system into the centralised control panel.</li> </ul>
<p>There is need for improved guarding and other safety systems for the machine to be site ready.</p>	<ul style="list-style-type: none"> <li>Additional guarding is being designed and installed.</li> <li>Relevant safety circuitry is being upgraded to a higher standard.</li> </ul>
<p>The bandsaw component of the machine operates well.</p> <ul style="list-style-type: none"> <li>Exchanging blades is not as cumbersome as anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>Integrate the bandsaw control system into the centralised control panel.</li> <li>Conduct a “streamlining” of the blade exchange path to make this process easier.</li> </ul>
<p>The circular saw component of the machine is easily able to conduct clean cuts through the hind leg shank.</p> <ul style="list-style-type: none"> <li>The circular saw remains stable throughout the cutting process and at present will not require additional stabilization.</li> <li>There is currently no ability to control the position of the circular saw.</li> </ul>	<ul style="list-style-type: none"> <li>Additional guarding will be added to the circular saw</li> <li>Multiple options to control the position of the circular saw have been investigated, these include: electromechanical actuators pneumatic pistons, rotating crank handles &amp; mechanical levers. However, for maximum simplicity and reliability, a simple handle extension has been selected.</li> </ul>
<p>A visual cue will be required to assist the operator easily identify the position of the circular saw cut.</p>	<ul style="list-style-type: none"> <li>After investigating multiple options, it has been decided that a laser attached directly to the circular saw assembly will provide the best opportunity for ideally locating the circular saw cut for every product.</li> </ul>

## Overall progress of the project

The project has five milestones with the following high level objectives:

Milestone	High Level Objectives
1	System Specification and 'mild steel' concept trials
2	Build and Evolve
<b>3</b>	<b>Complete Build and FAT</b>
4	Ship, insure, install and commission
5	Final Report and Video

With the design and build of the prototype machine completed and the in-house factory acceptance trials verifying the effectiveness of the concept, a range of modifications to prepare the machine for on-site production trials are now being carried out. Once ready, the machine will be sent to site.

## Recommendations

By making the operator remote from the bandsaw blade, the Lamb Hindquarter Double Tipping Saw has the potential to significantly reduce the dangers associated with knuckle/leg tipping. Although this first iteration of the machine relies on the operator to place the product onto the desired cut-line with the aid of a laser, there is opportunity for further if not complete automation that will deliver consistent high yield results. Throughput considerations have been central to the design of the conveyor belt system and there is ample capacity built into the machine. It is therefore recommended that the project be permitted to proceed to the next milestone.