

FINAL REPORT TEMPLATE

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1.0 EXECUTIVE SUMMARY

The Processor was necessitated to investigate an innovative method of paunch transfer due to a recent construction project on site. Historically the methodology of paunch capture and handling has been to capture, dry and transport paunch vis an auger and associated bin. This is the case with many if not the majority of abattoirs.

Investigation into several OEM components routinely used in other industries lead to the selection of two main components, being a peristaltic pump and FAN separator, to build a system that could transfer paunch to an appropriate position in a wet form with subsequent drying.

Although the project has gone through many iterations in concept and proof of operation, the main components are simple in operation and has proven effective in the application.

The project has led to the realization of further opportunities such as incorporation of other processes in the system as well as the further improvement of “green” effluent management.

2.0 INTRODUCTION

The objective of this project was to design, implement and evaluate a novel methodology of transferring and dewatering small stock paunch waste from tripe processing operations as a separated waste stream.

The need for this was due to construction activities that were executed, and a solution was required to transfer paunch waste without the need of traditional augers or drying equipment and the associated vehicles that are generally used to move the waste matter around. A compact solution was required for capturing paunch, transferring to a suitable area, and then drying and processing the material into wet and dry streams.

3.0 PROJECT OBJECTIVES

The Project entailed the design and demonstrated innovative handling of sheep paunch that could be implemented at similar facilities and included:

- The trial and final evaluation of a transfer system that comprised of a peristaltic pump as fundamental pumping method together with a water separating device and,
- Proven efficiency in process that could be implemented similarly for industry at scale.

4. METHODOLOGY

4.1. Capture

The initial concept developed was to purely capture the paunch directly from the tripe processing room and simply screen it to remove large pieces of foreign materials in an open top tank. A simple grated area (FRP) was used to prevent foreign materials passing to the pump. At the early stages of trial, these foreign substances only included fats, or tripe pieces that were inadvertently passed through as paunch by operational staff. This was soon corrected by change of procedure. Baling string which had been consumed by the sheep on farm was evident in all days of production.

Subsequently an array of foreign materials were identified as contaminants in the paunch. These included:

- Small pieces of fat and tripe
- Baling string
- Bone fragments (neck tips)
- Intraruminal Cobalt and Plastic “bullets”

Although the FRP mesh did prevent foreign materials to pass through as paunch, it was soon found that the grating got easily blocked with paunch from grass fed animals.



4.2 Maceration

To alleviate the problems related to screening, investigation was launched into adding a maceration pump to the system. For this purpose, a secondhand sewerage macerator was installed in line with the pump to evaluate results. Although this macerator did function well in terms of softer materials, we soon found that the baling string was causing the macerator to block up over time. At this stage, the FRP screening was still in place in conjunction with the macerator, and ultimately the problems related to blockages did not improve.

An order was placed for an Vogelslang X-Ripper shredder, which showed good potential in the application. This shredder has resolved all the problems with regards to foreign materials being introduced to the pumping system and has subsequently run effectively in the process as of July 2020.

It has been found that the shredder not only worked well on the softer materials, but has also proven effective in terms of handling the hard cobalt pellets found in the paunch material.



4.3 Pump

At the commencement of the investigation to possible pumping solutions, the characteristics of the paunch was taken into consideration. The consistency being similar to mine tailing slurry and even concrete slurry led to identifying a positive displacement peristaltic pump as being the best option in the application.

It was always the intent to create a slurry of paunch to allow for better flow to the suction of the pump. Recycled water was installed for this purpose, which has especially assisted with the creation of better consistency of paunch in grain fed sheep.

A 65 mm Peristaltic pump was selected, and this unit could handle solids of up to 35mm in size. This pump has performed effectively as of June 2020, but the hose assembly has been changed out after 6 months of operation due to an internal collapse in the hose. It was found that the identifier for hose collapse was intermittent blockages on the suction side of the

pump.

The pump has otherwise proven reliable with suction effective into vacuum ranges and discharge good enough to transfer material up to 75m away. The view is that this pump could pump even further distances, but that cleaning of the line would take longer after each day's production.

The system is flushed daily with green water to prevent hardening of paunch in the transfer line. This water is efficiently discharged to effluent collection via the FAN Separator.



4.4 Paunch dewatering and capture

As integral part of concept, paunch drying had to be addressed to ensure that a spadable product could be captured and exported from site.

The FAN separator is not a new technology in the abattoir or dairy industries, but has not specifically been used in this application before. Attempts to this purpose have been made before with mixed success.

The FAN Separator has proven extremely effective in this operation and delivers a dry paunch material. This has been installed and positioned at the plant primary screening operation, and has allowed for further opportunity relating to separation of cattle yard wash down effluent. This has further optimized primary screening operations.

The unit is also capable of handling a larger volume than being pumped to it at this stage, and integration with green waste streams from the beef operation is possible.



5. PROJECT OUTCOMES

5.1 Operational Impact and Benefits

The system has now been operational since September 2020, and although there have been initial teething problems, the necessity to implement the system has led to significant improvements and efficiencies in terms of paunch handling.

Realization of larger volumes of paunch collected have been noted, and testifies of the lack of proper screening using augers. The FAN Separator has proven efficient in operation and has shown results beyond expectation.

The combination of the X-Ripper Shredder together with the peristaltic pump has been reliable, and overall the system enjoys an almost 100% reliability with minimum maintenance requirements.

The added benefit of separating the green and red effluent streams have also been realized. This is very difficult to implement in existing plants with in-ground infrastructures, and this system now allows for the opportunity to effect green effluent stream treatment separate from red stream.

The system can be expanded to incorporate lairage and beef operation and the Plant is progressing well towards integration in the beef lairage.

5.2 Implementation to similar sites

As with any operation, the detailed implementation will differ from site to site.

Fundamentally the baseline components are off the shelf and can be introduced to any site. Capture methodology may have to be aligned to different setups, but overall there is no reason why a similar system can not be installed and improved upon by any small stock abattoir.

6.0 CONCLUSIONS/RECOMMENDATIONS

Ultimately this project has proven successful, and has shown that existing technologies used in other industries can be incorporated and adapted in abattoir operations.

Sites wishing to progress this solution would have to identify the specific build that suits their operations. The technology lends itself to all operations including large stock processing.

7.0 BIBLIOGRAPHY

None