final report

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Cost Benefit: Milmeq VIP Auto Load Shoulder Pelt Puller

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EXECUTIVE SUMMARY

This report discusses and delivers a cost benefit analysis for a VIP (Variable Independent Path) lamb and sheep Shoulder Puller that has been developed by Milmeq of New Zealand in conjunction with Meat and Livestock Australia Ltd (MLA).

This machine is installed at WAMMCO's Katanning lamb processing facility and replaces a manual load version of the same shoulder puller.

The purpose of this cost benefit is generally for use as a tool to assist processors in making a financial investment decision on a major capital purchase. This cost benefit compares the costs (Capital and Operating costs) with the benefits obtained from using the shoulder puller in the processing line.

The majority of the benefit for this piece of equipment comes from the saving of labour. 3 Full Time Equivalents (FTE's) were saved compared with the fully manual pelt removal operation.

Some of the benefit was lost due to some downgrading of pelts as a result of the shoulder puller although with careful workup and more consistent lamb s this could be reduced. Some other benefits such as OH&S, reduced bacteriological contamination and yield could are possible but could not be quantified and are considered minimal.

This Cost benefit model examines a number of financial tools that can help in financial decision making.

These include:

1. Net Present Value
2. Payback period
3. Rate of return
4. Benefit per head

All of these are standard financial methods of making a decision and all are included since different processors seem to prefer different methods of thinking in their financial decision making.

SUMMARY COSTS AND BENEFITS

The following chart summarises the benefits of using the VIP Puller at WAMMCO. In this case it shows that the Net Present Value (NPV[1]) is strongly positive illustrating that the investment was positive and exceeded the interest rate chosen for cost of capital. However the payback period for a 1 shift plant at a production rate of 980,000 lambs per year, the payback period was 4.2 years. For higher production plants this payback time would be reduced as it would for plants that were

[1] NPV is defined as the total present value (PV) of a time series of cash flows. It is a standard method for using the time value of money to appraise long-term projects. Used for capital budgeting, it measures the excess or shortfall of cash flows, in present value terms, once financing charges are met. The process of determining the Cost benefit was to compare the increase or decrease in costs as a result on having one VIP Shoulder Puller installed. Cash flows for a year were then estimated to determine the Net Present Value (NPV) and other similar financial cost benefit statistics

operating on multiple shifts.

For a plant operating on 2 shifts and processing 1,960,000 lambs per year the payback period would be 2 years. This suggests that the VIP Shoulder Puller is more suited to high production or multiple shifts processing plants.

SUMMARY OF RESULTS FOR WAMMCO'S KATANNING PROCESSING OPERATION (SINGLE SHIFT)

COST/BENEFIT ANALYSIS WAMMCO VIP AUTO LOAD SHOULDER PULLER	Benefit Per head	Annual per unit incl. capital	Annual per plant incl. capital	Pay back per unit (years)	Capital cost per unit	NPV
Net benefit	$0.13	$130,369	$130,369	4.20	$553,640	$544,375
Benefits						
Productivity/yield increase	$0.00	$0	$0			
OH&S benefits	$0.00	$0	$0			
Labour savings	$0.20	$199,846	$199,846			
Total benefits	$0.20	$199,846	$199,846			
Costs						
Capital costs	$0.06	$55,364	$55,364			
Other costs	$0.01	$14,113	$14,113			
Total costs	$0.07	$69,477	$69,477			

INTRODUCTION

WAMMCO International is the trading name of the producer owned and controlled Western Australian Meat Marketing Co-operative Limited (WAMMCO). The Co-operative is one of Australia's largest exporters of lamb, specialising in the production and export of premium quality chilled and frozen lamb products.

WAMMCO operates two plants, one at Katanning in WA and manages the Southern Meats Goulburn plant. The VIP Shoulder Puller is installed at the Katanning plant which process 4,000 head of sheep and lambs per day on a single shift roster.

There are two other installations of the VIP Shoulder Puller in Australia and approximately 14 operating in New Zealand.

HISTORY

Previous to installing the current VIP Auto load Shoulder Puller system WAMMCO had gone through a number of iterations on the method of removing their pelts.

Many years ago (approx. 10 plus), there was an "Old" Millers Mechanical Pelt Puller installed which was adequate but had many problems.

In an attempt to improve the carcase dressing WAMMCO removed this machine and went back to manual pelt removal. This required a larger number of stations on the slaughter floor as the process was all about manually "Punching" and "Thumbing" – or forcing the thumb or fist between the carcase and

the pelt. Whilst this improved the recovery of the skins (reduced damage) and better carcase presentation, the offset was a significant increase in the amount of labour to achieve this task.

The work of manual pelt removal is demanding physically with the downside being the increase in worker injury (anecdotally since there are no numbers to substantiate this) and increased carcase contamination from the wool coming in contact with the carcase (again anecdotally since there are no specific before and after bacteriological measurements to demonstrate the improvement).

As well as this WAMMCO is not geographically located near a large labour pool and sourcing employees has been difficult. The 457 Visa scheme has allowed WAMMCO to maintain production levels but the reduction of labour in the plant, because of the difficulty of sourcing good people is always a priority and often becomes a 'Stay in business' decision rather than a return on investment decision.

In an effort to overcome some of these disadvantages, WAMCCO made modifications to several sections of their slaughter floor during a major productivity upgrade. Included in these modifications was the Installation of Milmeq's VIP Semi-Automatic Shoulder Pelt Puller or "Manual Load" Shoulder Puller.

Unfortunately the Capital Expenditure justifications for this upgrade were agglomerated into the one submission and the justifications for the individual Pelt Puller upgrade, to establish the expected benefit to be achieved, cannot be extracted from the original submission.

In the previous configuration of the 'Manual Load' Shoulder puller, the equipment needed one person to lift the shoulder flaps of the pelt into the gripper arms of the puller and then press the 'activate' button. In a recent upgrade of several years ago, this machine was converted to the fully automatic machine that replaced this task and is in operation today.

This Cost Benefit Analysis uses the costs of the fully manual 'punching' system of pelt removal and compares it with the fully automated system and ignores the Manual Load iteration of the Shoulder puller. Advice from the manufacturer, Milmeq, was that the differences in cost between a Manual Load version of the shoulder puller and the fully automated version are so small that they could not see any reason that any processor would use the manual load version since the fully automatic version would replace one full time equivalent employee. The resultant cost differential means that the manual load system would never be a commercial consideration.

KEY ASSUMPTIONS

The following Key Assumptions have been used in the development of this Coat Benefit.

EQUIPMENT LIFE COST AND INTEREST RATE

Expected Equipment Life in Years	10
Interest rate (%) (Cost of Capital)	**7%**
INITIAL Purchases	
Initial capital purchase cost	$450,000
Installation cost	$79,040
Commissioning costs	$15,600
Initial Training – operational	$3,480
Initial Training – technical	$2,520
Additional changeover parts	$0
Initial essential consumables and spare parts	$3,000
Insurance spares	$0

	Sub total	$553,640
Other Sources Funding %		0%
	Total	**$568,640**

Details of the Capital Costs as supplied by Milmeq are included in Appendix 1

Actual costs will vary depending on shipping and transport time for equipment, travel and accommodation for the technical installation and commissioning team and the difficulty of undertaking the plant modifications particularly the pit required for the puller to operate within.. These numbers above have been selected to reflect a "typical" plant which is not located in a capital city and is several hours away from a major port.

Plant Operating Times

The following reflects the average total operating hours per year.

Number of shifts/day	**1**
Length of one shift (hours)	**7.5**
Operating days per week	**5**
Shifts per week	**5**
Public holidays per year	**10**
Shut down days per year	**5**
Extra Weekend working shifts	**0**
Other	**-**
Operating shifts per year	**245**
Operating hours per year	**1838**
Nominal Production per day	**4,000**
Nominal Production per year	**980,000**

AREAS OF COSTS OR BENEFITS

It was unfortunate that not all of the information needed to develop a comprehensive cost benefit had been recorded or there was not sufficient detail to enable what information was available to be used in all areas of the cost benefit. Accordingly, there are certain assumptions that have been made and it is expected that these assumptions will be challenged and the cost benefit modified as other processing plants install this equipment. It is expected the cost benefit model will be updated over time with this new information with the result being a much more confident model.

The following table summarise the areas where potential benefits may arise and were the areas concentrated on during discovery with WAMMCO's processing staff.

Area of Cost/ Benefit	Benefit	Cost
Reduction in Labour Need to consider:- • Direct Labour Costs • On-costs of Superannuation Workers Compensation etc. • Training and Recruitments costs reduced to an average per person basis	Reduce number of Full time equivalents workers required to man the chain	Increase in the amount of operational Labour
Maintenance	Less maintenance required due to reliability of new machinery and equipment	Increased costs as a result of higher breakdowns, hence more maintenance labour and parts and/ or major rebuilds

Operational Stoppages	Less chain stoppages with the new system compared to the previous system not being able to keep up with the chain or causing chain stoppages for other reasons	Increased Chain Stoppages due to breakdowns
Carcase Yield Improvement	Increases in yield as a result of cleaner removal of the.	Reductions in meat yield due to removal of fat or meat resulting in some product downgrade
Carcase Cleanliness	Less contamination on the carcase necessitating less people on the detain rail to remove hairs etc. Pelt removed more cleanly and less fat is pulled off in critical `High value cut area	More people required more often than under the manual system to remove hairs or other contaminants that have come from the pelt
Pelt Improvements/ Detractions	Pelt is pulled off more cleanly increasing value or reducing tears	Pelt is more damaged and increase in downgraded pelt grade
Production reductions due to Low labour force numbers	Reduced production slowdowns as a result of less need for labour due to reduced manning on slaughter floor	Lack of labour means that reduced production rates are occurring due to low numbers of staff and manning re-arrangements

BASIS OF COST BENEFIT ANALYSIS

The following assumptions and /or determinations have been made in developing this cost benefit:

INITIAL PURCHASE COSTS (CAPITAL)

These costs are all of those related to the installation of the equipment so it is a productive operating unit. Training of operators and maintenance people has also been included here as this is considered an initial cost of enabling the machine to become productive.

Initial work and assessment leading to a decision to purchase

A nominal figure of $10,000 has been allowed for here as the cost to WAMMCO to review the available technologies and the costs associated with making a decision to purchase.

Initial capital Purchase Cost

This price includes the cost to purchase the equipment plus any freight to the site and is what would be expected when a quote was provided after an enquiry. The price used has been obtained from supplier of the system and reflects the “commercial” median price of such an item which is largely bought “off the shelf”. It comes with the normal manufacturers warranties.

Installation Cost

This includes the time and materials required to fully install a system into a processing plant. It would include building modifications if they are needed.

Commissioning Costs

This includes all of the labour cost (predominantly) to get a system to a stage where it is working consistently and. It would include all software modifications and integration issues with making the system work within the Processors existing slaughter chain.

Initial Training – Operational

Includes the training of operators, supervisors and cleaning staff in how to turn on and get ready to operate and the basic trouble shooting techniques.

Initial Training – Technical

Costs associated with all training materials and time to make a technical person from the Processors competent in the basic trouble shooting and capable of fixing 95% of issues that arise either on their own or with telephone and internet access support. This includes both Mechanical and Electrical trades.

Additional Changeover Parts

Costs associated with purchasing additional items that can be removed and changed over as a module and the old module sent back to the manufacturer for repair and or refurbishment.

Initial Essential Consumables and Spares parts

This includes cost of those parts that are needed to be replaced on some regular basis. Such items would include the saw blade in the Brisket Saw and the robot protective cover.

Insurance Spares

Insurance spares are those spares that are held because of the potential long downtime associated with them not being readily available. These spares are a function of the geographical position of the plant in relation to the source of supply and it could be assumed that a plant in Western Australia, 3 hours drive from Perth might reasonably carry more Insurance spares than a Processor located 2 hours drive from Sydney.

In WAMMCO's case, they are located 3 hours drive from Perth, a 5 hour flight from the major Australian service centre for Milmeq located in Brisbane and a modest dollar value of insurance spares ($3,000) have assumed to have been purchased.

Sources of other funding and at what % of Capital Cost?

This allows for any other grant money that may have been available that could be utilised and could make a project more attractive. In this case the cost benefit has taken no other sources of funding.

POTENTIAL SAVINGS

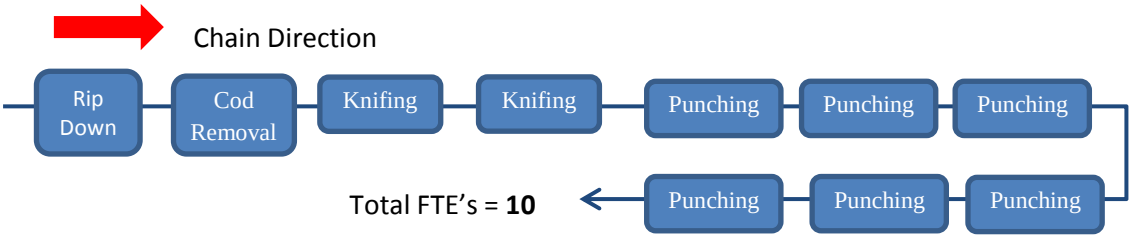
The following items lists those areas where costs have potentially changed compared to the fully manual operation of pelt removal from around the shoulder.

Operational Labour

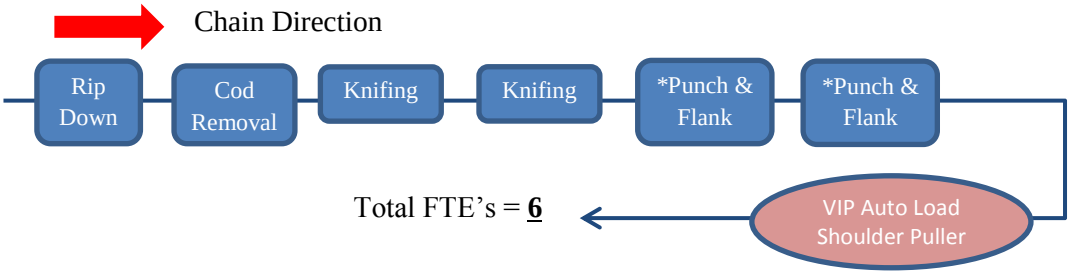
The diagrams below show a comparison of the labour needed to prepare the pelt and then remove it cleanly in the shoulder region of the carcase using the manual method of pelt removal compared to using

the VIP Automatic Pelt Puller

Slaughter Floor operations in lead up to shoulder pulling –WAMMCO **Manual Method** Full Time Equivalents



Slaughter Floor operations in lead up to shoulder pulling –WAMMCO **Automatic Method** Full Time Equivalents



*Includes manual assist flanking tool installed with the VIP Milmeq automatic shoulder puller.

The top diagram illustrates the staffing that WAMMCO chose to employ when use a fully manual shoulder pulling system. Since then, better tools have been developed to assist the 'Puncher' to remove the pelt, reduce injury and improve efficiencies.

One of these tools is an air assisted punch and flank tool provide by Milmeq. WAMMCO have chosen to install these tools upstream of the VIP Auto Puller but these tools can also stand alone. It is unfair therefore to include them in the comparison with a VIP Auto Load system and a fully manual system.

Without the use of these air assisted punching tools, the full time equivalent people employed would increase from **6 to 7.**

VIP Auto Load Shoulder Puller			
Total labour units required to operate including on-costs	FTE	7	$469,437
Cleaning labour	hours/day	0.15	$1,341
Sub Total			$470,778

The machinery of the VIP shoulder puller requires cleaning which was not necessary with the full manual system. This additional cleaning time is estimated to be 10 minutes per day or 0.15 of an hour

Existing fully manual system			

Total labour units required to operate including on-costs	FTE	10	$670,625
Cleaning labour	hours/day	0	$0
Sub Total - Existing system			$670,625

The net benefit in labour saving is listed below.

Net savings in operational labour			$199,846

Improved Processing Efficiencies

There were no improved processing efficiencies observed.

Increased Yield Gain

Discussion with the WAMMCO operations personnel suggested that there was no opportunity for increased carcase yields from the VIP Shoulder Puller compared to the manual equivalent.

Operational Materials

This is an allowance predominantly for cleaning materials and other incidentals such as scourers etc. since there is an increased cleaning time and thus cost.

No allowance has been provided here for the existing system since the costs for the automated system are considered the "Extra" costs to clean the machine.

VIP Auto Load Shoulder Puller	Units	Value	Cost/Year
Cleaning materials	$ per shift	3	735
Sub Total			735

Maintenance Labour

These costs are associated with the need for an Electrician or a mechanical trade's person to undertake some form of repair. It was not possible to unravel these costs from other maintenance costs within WAMMCO.

An assumption of 10 minutes on average per day to allow for such items as daily greasing; contacts that don't reset at start-up and an additional 30 minutes per week on startup and another 1 hour per week are reasonable estimates to be able to maintain this equipment.

This assumes that changes or improvements to the Software and program changes as a result of continued development, will be undertaken by manufacturer and provided at no charge to Lamb Processor

The existing manual system has no need for any maintenance

VIP Auto Load Shoulder Puller	Units	Value	Cost/Year
Daily maintenance	Hrs./Day	**0.17**	$1,547
Scheduled preventive maintenance	Hrs./Week	**0.3**	$557
Unscheduled maintenance	Hrs./Week	**0.3**	$557
Breakdowns	Hrs./Week	**0.3**	$557
Software mods & cleanups	Man Hrs./Year	**0**	$0
Other maintenance		**0**	$0
Costs for maintenance labour			**-$3,218**

Maintenance Materials

These material costs have been estimated as listed in the table below. It is also assumed that the majority of material costs in the first 12 months are covered by Warranty. Additional major maintenance items are included with the Overhaul costs.

There are no maintenance costs for the manual method.

VIP Auto Load Shoulder Puller	Units	Value	Cost/Year
Maintenance consumables	Lump sum		$200
Oils & greases	Lump sum		$100
Sub Total			**$300**
Costs for maintenance materials			**-$300**

Occupational Health and Safety

The use of purpose built machinery replacing a manual operation should reduce the number of personal injuries that occur, particularly sprains and repetitive strain type injuries. The greater number of mechanical and electrical components in an item of equipment will expose the Mechanical and Electrical trades to greater risk but with the appropriate training this should be far less than the potential for operator injuries.

The main benefit areas should be in

- Insurance Premium reduction
- Workers Compensation Cost savings
- Direct Employee Medical Costs

In this instance there was no readily accessible data to be able to determine these benefits.

Other Savings

Other Savings - Pelt/ Hide Improvement

The VIP Shoulder puller normally doesn't damage pelts during its normal operation. The amount of damage is a function of a number of factors including length of pelt; type of Lamb –Merino, Cross breed or Dorper; age and size of the carcase. These factors impact the path that the Shoulder Puller takes to remove the pelt. Under the full manual method, the operator (Punchers) is capable of adjusting for these differences.

Most damage to the pelt is as a result of knife cuts that occur during the work-up. Best estimate of total pelt damage from all sources is 5% and this includes knife cuts; shoulder puller damage and final pelt puller damage.

In discussion with the WAMMCO team including the pelt foreman, it was estimated that damage as a result of the shoulder puller directly that would cause the pelt to be downgraded would be estimated at an additional 0.5%. If an additional 0.5% of all pelts are damaged by the shoulder puller these are assumed to be downgraded to a value of $2.00 compared to an undamaged pelt of $8.00.

		Units	Cost/Year
Benefit per pelt/hide/skin	0.5%	-$6	-$29,400
Sub Total			-$29,400
Existing system			$0
Savings in pelt/hide improvement			-$29,400

Other Savings - Bacteriological Improvements

No Information is available on the improvements to the reduction in bacteriological load as a result of the pelt being removed with less human interaction. Anecdotally there has been an improvement but several major capital projects were completed at once and the improvement in lower bacteriological count cannot be attributed to any one project.

Any benefit that has been achieved in this area has therefore been ignored.

DIRECT EXPENDITURES

These are expenditures that are directly attributable to the installation of the piece of equipment that were not present under the previous system.

Electricity

This covers the Costs of power associated with powering the electric motors and electronic power supplies. The cost been assumed at 25c/kWh. A 10% extra allowance has been made to provide for additional running time for startup running time.

Assumptions	**Unit**	**Value**
Installed power	KW	2.0
Hours of use per day	hours	8.3

Cost per KWH	$	$0.25
Estimated cost per	Day	$4.1
Costs for electricity	**Per Year**	**$7,580**

Major Over Haul Costs

Experience in other industries with robotic machinery has shown that their life is not easily definable. Rather, as technology changes the robotic equipment and sensors are upgraded or replaced rather than the whole machine replaced.

Advice was sought from Milmeq who provide the detail needed and which is summarised below. The correspondence from Milmeq regarding overhaul costs is in included in Appendix 2

Item	**Life (Hours)**	**Life (Years)**	**Cost to Overhaul**
Lamb Shoulder Puller - Major Overhaul - includes Replace & upgrade sensors & electronic systems	20,000	10.9	$43,810
Minor Overhaul -Replace Minor Components	10,000	5.4	$8,810
Costs for Major Overhaul			**$52,620**

Other Costs

LOSS OF PRODUCTIVITY

This has not been considered at this time because of the Complexity of including such a figure. Whilst it is a real cost it is not part of the scope of this analysis and has been ignored.

EMPLOYMENT AND ONGOING TRAINING

This assumes that ongoing training of the Meat Processors operational, maintenance and technical staff will be required on a yearly basis. Basis for cost is for a daily charge of $1,200 for 1 trainer plus a per diem cost of 300 per day.

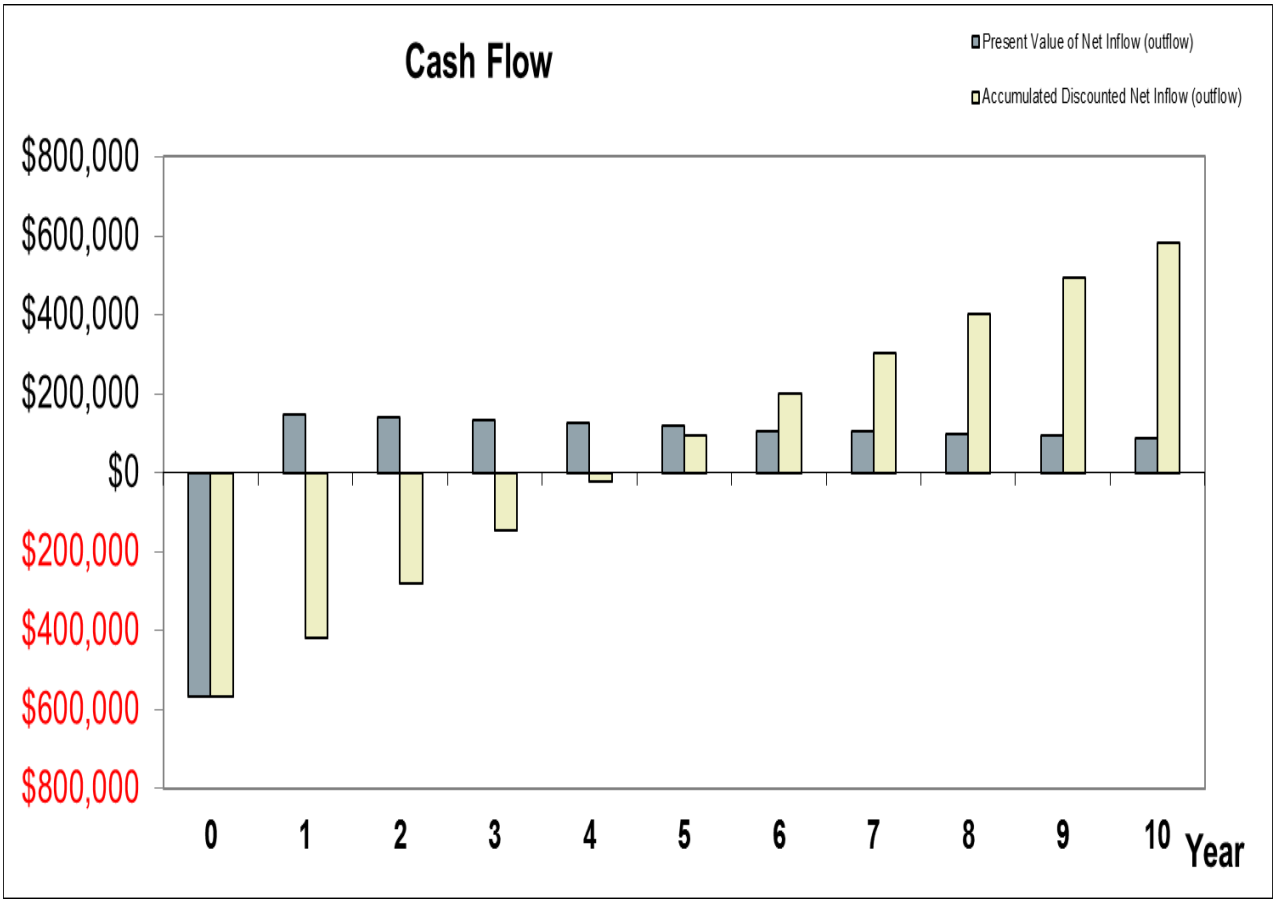
It is also recognised that by comparison, the existing manual system will still need training and re-training due to labour force turnover. This is a much lower value than the ongoing technical training of the electrical and mechanical trades on a robotic system. Accordingly a nominal value to reflect the need for retraining a workforce that is constantly changing as employees leave and there is a need to employ and train a new operator.

Lamb VIP Auto Load Shoulder Puller			

Ongoing training of technical and operational staff			$1,800
Sub Total -			**$1,800**
Existing System			
Employment and Training Costs			$500
Sub Total - Existing System			**$500**
Costs of ongoing training			**$1,300**

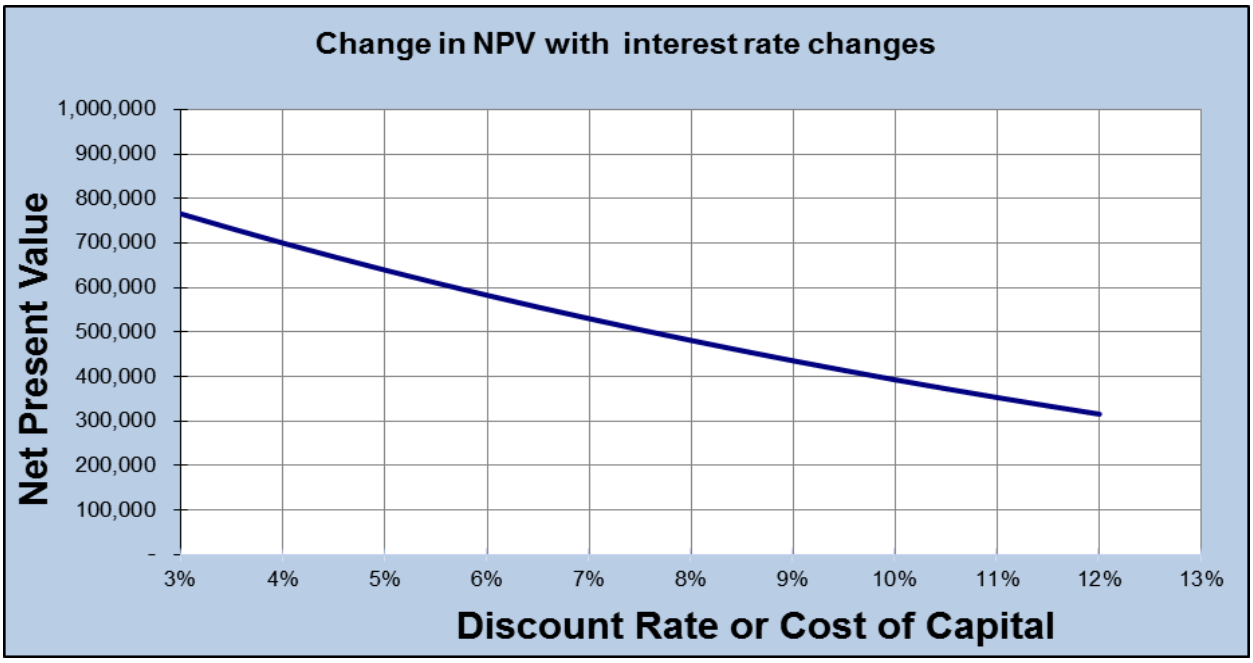
CASH FLOW CHART

The following chart reflects the cash flow generated from the excess of benefits over costs which contributes toward repaying the cost of the VIP Shoulder Puller.



IMPACT OF INTEREST RATES ON NPV

The following chart demonstrates how the change in the interest rate chosen for the cost of capital impacts on the Net Present Value of the VIP Shoulder puller.


Change in NPV with interest rate changes
Net Present Value
1,000,000
900,000
800,000
700,000
600,000
500,000
400,000
300,000
200,000
100,000
-
3%
4%
5%
6%
7%
8%
9%
10%
11%
12%
13%
Discount Rate or Cost of Capital

APPENDIX 1 - CORRESPONDENCE WITH MILMEQ

APPENDIX 2 – EXCEL SPREADSHEET OF COST AND BENEFIT CALCULATIONS