final report

Project code: P.PSH.0468

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Date submitted: April 2011

Date published: July 2011

PUBLISHED BY
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PVE robot system one year technology support and training

This is an MLA Donor Company funded project.

Meat & Livestock Australia and the MLA Donor Company acknowledge the matching funds provided by the Australian Government to support the research and development detailed in this publication.

Contents

1 Background

The training offered during the implementation phase of a project is aimed at providing routine maintenance and operational awareness to operator and maintenance staff, it does not cover in depth trouble shooting, programming and or scheduled servicing required to uphold the system integrity throughout its working life. I was felt that further training and service assistance was required following the installation of robot systems with the aim of making the producer more self sufficient at the end of the process.

2 Project Objectives

The purposes of this project are detailed below:

- The purpose of To ensure these innovative robotic/automated solutions installed at Peel Valley meet their full potential providing benefit to Peel Valley and the industry
- To conduct quarterly scheduled service visit on each robotic/automated solution installed at Peel Valley (Rear VacSan, Front VacSan and Brisket Cutter) for the first year of production. It is envisaged that following the first year in production these service visit can be reduced in duration and/or frequency for future years.
- To conduct a series of scheduled training sessions with PVE tech maintenance staff to ensure they have the skills necessary and confidence required to service and maintain the equipment long term with reduced requirements for involvement by Machinery Automation & Robotics.
- Provision of ongoing remote system support, available 24/7 through MAR 24/7 service line.
- To conduct ONLY IF & WHEN NECESSARY - Non Warranty service visit to Peel valley should the need arise from damage to equipment or process changes requiring assistance from MAR
- Provide a documented report that outlines future requirements for ongoing support, training and service for the systems installed and similar equipment being developed by MAR.

3 Methodology

The project is divided up into the following milestones and these formed the structure of the project.

Milestone 1:
Conduct 1st scheduled service visit for Rear Vac San, Front Vac San and Brisket Cutter robot systems.

Milestone 2:
Conduct 1st scheduled training session for 3 off PVE tech maintenance staff

Milestone 3:
Conduct 1st scheduled service visit for Rear Vac San, Front Vac San and Brisket Cutter robot systems.

Milestone 4:
Conduct 1st scheduled training session for 3 off PVE tech maintenance staff

Milestone 5:
Conduct 1st scheduled service visit for Rear Vac San, Front Vac San and Brisket Cutter robot systems.

Milestone 6:
Conduct 1st scheduled training session for 3 off PVE tech maintenance staff

Milestone 7:
Conduct 1st scheduled service visit for Rear Vac San, Front Vac San and Brisket Cutter robot systems.

Milestone 8:
Conduct 1st scheduled training session for 3 off PVE tech maintenance staff

Milestone 9:
Provision of on going remote system support, available 24/7 through MAR 24/7 service line

Milestone 10:
Document report and outline future requirements of on going support training and service.

Milestone 11:
Conduct when necessary Non Warranty Service visit

Milestone 12:
Conduct when necessary Non Warranty Service visit

Milestone 13:
Conduct when necessary Non Warranty Service visit

Milestone 14:
Conduct when necessary Non Warranty Service visit

4 Results and Discussion

4.1 Training Sessions

The training sessions were conducted periodically over the course of the project mainly depending on staff availability at Peel Valley. As well as general cell operation training that included:

- System start up and shut down
- Fault recovery
- Robot manipulation via the teach pendant
- Cell safety controls
- Cell bypass and cleaning mode
- Mechanical maintenance routine

the robot training courses consisted of a basic course and an advanced course. The basic training course covered the following:

Training goal:
The "Basic Robot Programming" seminar is aimed at the operating & maintenance personnel using the robots. This seminar provides training with regards to

- The proper and safety-conscious operation of a robot in a production environment,
- The modification and maintenance of robot application programs
- The creation of basic programs to service the application.

Prerequisites:

- Technical training (electro-technical or mechanical)
- Familiarity with PCs and Windows is helpful

Length of Training Program: 2 consecutive days

Topics covered:

- Proper use of the safety facilities for robots
- Safety requirements for programming
- Components of the robot system
- Operating the robot system (start-up, shut-down, manual traversing, program selection, automatic program execution)
- Commissioning the robot system (installation, connection, mastering, tool calibration)
- Creating simple application programs (programming of motion instructions and predefined application technology instructions)
- Integrating application programs into the main production program
- Dealing with faults

Final assessment:

- The course ends with an achievement test.
- A Statement of Completion is issued on successful completion of the course.

While the advanced training course covered the topics below:

Training goal:
The Advanced Robot Programming seminars aimed at the programming level for ABB industrial robots. Building on the Basic Robot Programming seminar, programming knowledge and capabilities are extended in this seminar. The main emphasis of the seminar is the ABB programming language RAPID with a specific focus on typical functionality used in red meat applications.

Prerequisites:
- Seminar “Basic Robot Programming”
- Basic knowledge of a programming language preferred (e.g. Basic, Turbo Pascal, C etc)

Length of seminar: 2 consecutive days

Topics covered:
- Language elements of the RAPID programming language & system programming
    - Tool Configuration, TCP
    - Workobject base configuration
    - Input / Output configuration
    - Devicenet / profibus interfacing
    - Advanced Motion instructions
    - Program Optimisation
    - Interrupt programming
    - Trigger instructions
    - Signal exchange with a higher-level PLC
    - Configuring the Automatic External interface

Final assessment:
- The course ends with an achievement test.
- A Statement of Completion is issued on successful completion of the course.

The attendance at each of the sessions varied due to staff fluctuations at PVE but the attendees who were present at all sessions now have a solid grounding in the operation and basic programming of the robots on site.

4.2 Service Visits

The routine services were conducted regularly throughout the project and allowed MAR to monitor the systems and rectify any potential issues before they became real problems. The Non Warranty Service visits were used to make modifications to the systems to enable them to keep up with the rest of the plant following increases in line speed and cover the replacement of a faulty robot teach pendant.

5 Success in Achieving Objectives

Through the course of this project MAR has:

- Conducted regular service visits to ensure the robotic systems installed at Peel Valley meet their full potential and provide benefit to Peel Valley.
- Conducted a series of training sessions with Peel Valley staff that has ensured that they have a solid grounding in the operation and basic programming of the robot systems on site.
- Used the Non Warranty Service visits to cover changes required to the robot systems to cover changes in conditions on site and replacement of a damaged teach pendant.

6 Conclusions and Recommendations

It can be concluded from this first Technology Support and Training project that such projects are of great advantage to producers. It allows extended and continuous training of maintenance and operator staff to be undertaken such that they become familiar with and confident in using the systems and more able to address issues on site as they occur allowing the up time of the systems to be maintained.
Regular servicing of the systems has allowed MAR to monitor the systems and address any potential problems as they arise before they become real issues.
It would be recommended that producers installing similar systems setup similar Support and Training contracts as it can be seen that it has been of benefit to Peel Valley Exporters. It would also be recommended that Peel Valley setup an ongoing maintenance and training schedule with MAR to continue building the knowledge of the maintenance staff and ensure continuing smooth operation of the robot systems onsite.