

# SNAPSHOT

## CONTAINER LOADING PILOT

### INSTALLATION

**Project Report Reference: 2014.1011**

**Date: 13 December 2017**

#### **Project Description**

The objective of this project was to develop, install and test an automated container loading system for the packing of meat cartons into a refrigerated shipping container. This will be a pilot system, which will run extended trials for development purposes.

It was identified that the majority of Australian meat is exported in cartons and packed in refrigerated shipping containers. This shipping method produces a number of challenges including OH&S and loss of product and an automated solution would be of great value to the Australian Industry.

Mechanical equipment currently has the ability to lift, rotate and place cartons in a set location - consider palletizing and de-palletizing systems. There is already a system available in Europe which can load shipping containers. However the system has constraints which prevent use in a meat processing facility. They are:

- // The operational speed of the system being too slow for meat processing plants.
- // The inability of the system to operate in cold environments.
- // The capability of the suction cap when handling wet, slippery and icy cartons.

The current Scott system has successfully demonstrated proof of concept. Scott personnel and stakeholders have identified some areas for consideration during the next phase of this project.

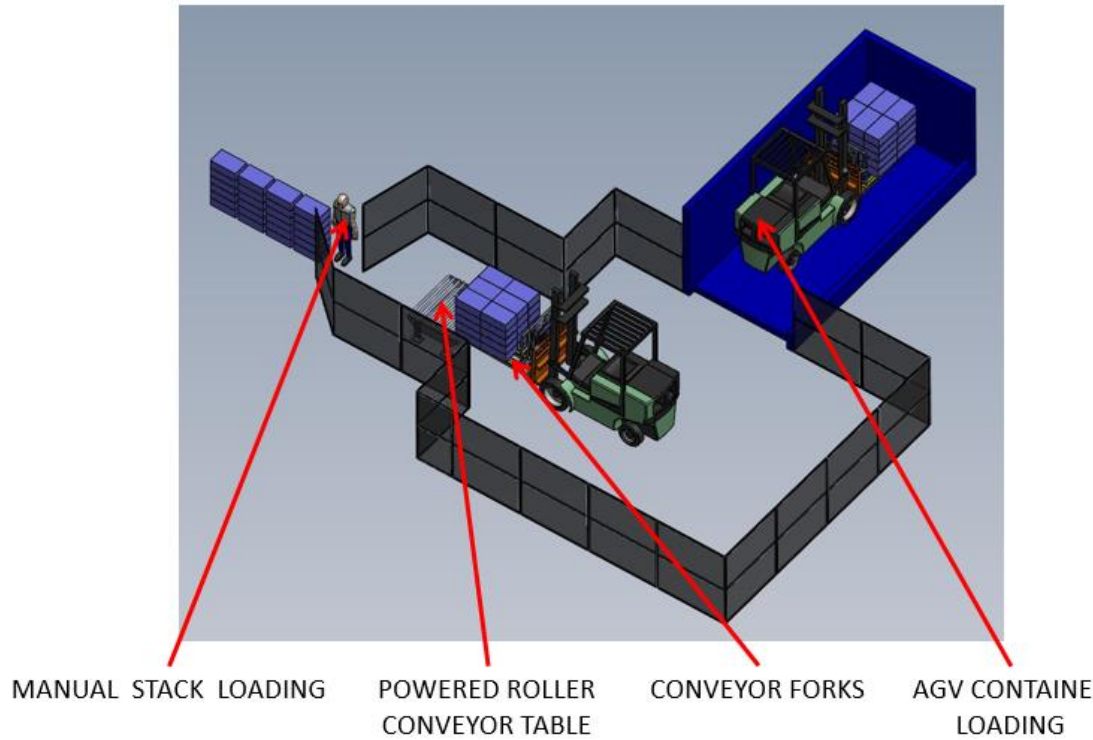
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**Project Content**

The figure below is an overview of the current system.



*Figure 1: AGV Container Loading System – for site trial*

A box stack of up to 6 boxes to a layer and up to 6 layers high (36 boxes in total) is presented to the system on the powered roller conveyor table. The whole stack is then moved to the driverless AGV forklift, which then automatically loads the container with the box stack and then returns to the waiting position. This process is then repeated until the container is full.

**Project Outcome**

Key points to note are the elimination of pallet use and the relatively large stack size (36 boxes) per AGV forklift move. Stability was found to be an issue and the boxes were strapped. A design change has been identified which will increase stability, allow an even greater load per

move and reduce cycle time. This will form part of the next phase of the project.

Other improvements include a concept that can receive pallets or cartons via a conveyor and convert those to a block of cartons to be moved into container, this modification to the current concept will also allow different size of cartons to be used,

Whilst ultimately successful and supported by the stakeholders who attended a demonstration at the trial site, this project had numerous challenges. The structure of the milestones were such that the design was constantly challenged and when it became apparent that the original concept proposed was probably not going to deliver the required results, the Scott team were able to use the knowledge gained and re-design the system.

The original design was found to have significant project risks, including:

- // Restricted real estate at site.
- // Cycle time. The required cycle time was calculated to be achievable, but only just! There would be no room for future improvements due to the limit of three boxes per push.
- // Recovery from a fault. If a box was to fall or get jammed, system recovery would be difficult. There is no personnel access in front of the loader and the IT process for retrieval, bringing out the boxes and deleting/re-scanning would have been complicated.

A new concept for automated container loading, was developed specifically to address the risks listed above, minimize the risks associated with the previous concept by use of the Scott Automation and Robotics Automated Guided Vehicle (AGV). This allows a larger stack to be constructed, hence dramatically improving cycle time, and allows easier recovery from fault conditions.

The hardware/software already purchased was still utilized. Some equipment, such as the customized AGV, was supplied to the project from Scott Automation and Robotics stock and returned to Scott Automation and Robotics stock at completion of pilot trials. This allowed

the project to be completed within the original budget, while minimizing the risks associated with the design.



*Figure 2: Placement of an adjacent stack within the container using the current Scott Automated Guided Vehicle (AGV)*

#### **Benefit for Industry**

Automation of the container loading process has potential benefits in relation to OH&S issues, traceability and quality, and loading efficiency.

Improvement areas for future concept are:

- // Port marking to be added.
- // Cartons to be scanned and proof of load report to be issued.
- // Pictures of cartons to be taken for proof of load.
- // How to address different size of cartons/different size of containers

Scott engineers are currently working on the next phase of the project, incorporating the above requirements.

#### **USEFUL RESOURCES**

[Scott website link](#)

