

**The 11th Asian-Australasian Conference on Precision Agriculture (ACPA 11)
October 14-16, 2025, Chiayi, Taiwan**

Development of an Electric-Assisted Handling System for Pig Farm

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Abstract

In swine farming, manure management is a critical yet labor-intensive task. With increasing agricultural labor shortages, optimizing farm infrastructure to reduce manual workload has become essential. Many pig farms in Taiwan utilize elevated slatted floors (concrete or cast iron) to separate pigs from their waste, allowing excrement to fall through gaps for later disposal. While this design improves hygiene by reducing direct contact, the heavy and bulky slatted panels pose significant challenges during cleaning—particularly when manually relocated for thorough disinfection. Currently, no specialized equipment exists to assist in handling these panels. To address this issue, this study developed an electric-powered overhead handling system designed for narrow farm aisles. The system enables precise lifting and transport of slatted floor panels, facilitating efficient cleaning of underlying trenches and panel gaps. Field tests demonstrated that the device reduces cleaning difficulty by minimizing physical strain and improves sanitation quality, thereby lowering the risk of disease transmission in swine operations. This innovation offers a practical solution to enhance farm hygiene while mitigating labor dependency in modern pig production systems.

Keywords: Pig Farm, Elevated Slatted Floors, Overhead Handling System.

INTRODUCTION

In pig industrial, manure management is crucial for maintaining environmental hygiene and animal health. Many pig farms in Taiwan utilize elevated strip floors, which allow excretions to fall directly into underlying storage pits or channels. This design reduces waste accumulation within the pens, minimizes direct contact between pigs and manure, and helps prevent diseases such as enteritis, hoof disorders, and other infectious conditions. As a result, it enhances overall breeding efficiency and reduces the need for daily manual cleaning, thereby alleviating labor demands on farm workers. However, if not cleaned regularly, strip floors can become breeding grounds for bacteria and parasites, leading to enteritis, dermatological issues, and other communicable diseases among pigs. Therefore, periodic and thorough cleaning is essential to sustain a healthy growing environment and ensure the well-being of the animals.

MATERIALS AND METHODS

Strip floors are structurally bulky and challenging to handle during cleaning and disinfection procedures. To address these issues, this study developed an electric overhead handling system specifically designed for narrow farm aisles. The system is equipped with a lifting mechanism that enables operators to efficiently hoist, transport, and reinstall floor panels, facilitating thorough cleaning and disinfection of the underlying trenches and gaps.

RESULTS & DISCUSSION

Based on the workflow requirements for cleaning strip floors, an electric motor powered system was comprehensively designed and fabricated. A schematic diagram of the electric assisted handling device is shown in the figure below. Field tests conducted on swine farms demonstrated that the system exhibits reliable continuous operation performance. The hoisting and transport mechanism significantly reduced the physical effort required for manually moving and handling floor panels, while also shortening the time needed for cleaning and disinfection procedures. This effectively addresses the inefficiency of traditional manual methods. Furthermore, the structural design of the system allows it to adapt to the narrow aisles commonly found in Taiwanese pig farms, highlighting its practicality.

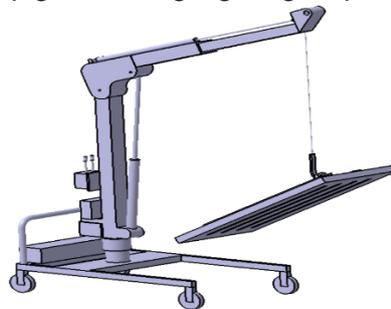


Fig.1 The design electric overhead handling system

CONCLUSIONS

This study developed an electric overhead handling system designed for the transportation of strip floor, enabling thorough cleaning of the underlying manure collection pits. The proposed system offers a practical and effective solution for modern pig production systems, contributing to sustainable and hygienic farm operations.

ACKNOWLEDGEMENTS

The authors gratefully acknowledge the support of Ministry of Education, R.O.C. and collaboration provided by the participating institutions and farms, which were essential to the successful execution of this study.

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