



Future Farms Pte Limited t/a Rooster Poultry

Quality Circle Team – STRAPS

Project Year: 2025

REDUCING MORTALITY IN CAGE SHED

Members of Team STRAPS:

- **Team Manager:** Mohammad Tareek Jamil
- **Team Leader:** Shohil Partap
- **Team Facilitator:** Umeer Ali
- **Team Members:** Krish /Nivikesh and Semisoni

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The Quality Circle Team STRAPS would like to express our sincere appreciation to the management of Future Farms Pte Limited t/a Rooster Poultry for providing us with the opportunity, support and resources to undertake this improvement project.

We would like to acknowledge the support and guidance provided by the Head of Livestock and other members of management throughout the project. Their encouragement allowed the team to investigate the problem, conduct trials and implement a practical solution at Wairabetia Farm.

We also extend our appreciation to all staff members who participated in the implementation, monitoring and data collection activities. Their cooperation, commitment and teamwork were essential to the success of the project.

Special appreciation is extended to the Hatchery Department for assisting the team in monitoring chick quality and hatchability information, which helped us verify other possible causes of mortality.

The team believes that the success of this project demonstrates the value of teamwork, employee involvement, continuous improvement and the effective application of Quality Circle tools.



EXECUTIVE SUMMARY

The Quality Circle Team STRAPS, consisting of members from the Livestock Department of Future Farms Pte Limited t/a Rooster Poultry, undertook an improvement project in 2025 to address the increasing 7-day mortality in the cage shed at Wairabetia Farm.

The project was initiated after the team identified a significant increase in 7-day mortality following several production cycles after the commissioning of the cage system. The average 7-day mortality during the initial period was approximately **2.18%**. However, during Cycles 3 and 4 of 2025, mortality increased to an average of **14.17%**. Investigation showed that damaged cage-shed straps had created wider openings in the cages, allowing chicks to escape and fall to the ground. Due to the height of the cage system, many of these chicks sustained fatal injuries.

The team used Quality Circle techniques including brainstorming, a Gantt chart, decision matrix, cause-and-effect analysis, flow charts, SMART target setting, PDCA methodology and cost-benefit analysis. Through the decision matrix, high 7-day mortality received the highest priority score of 24 and was therefore selected as the project for 2025.

The team developed an innovative and low-cost solution by reusing damaged conveyor belts. The damaged belts were cut into approximately 5 cm strips and installed as replacement straps in the cage shed. Staff were trained and the implementation was closely monitored.

The results after implementation were significant. The 7-day mortality reduced to **1.96% and 0.98%**, giving an average of **1.47%**, compared with 14.17% during the problem phase and 2.18% during the original baseline period.

Production performance also improved. FCR improved from an average of **2.76 to 1.50**, while PIF improved from approximately **127.80 to 312.80**. The project also contributed to an additional **24,521 birds harvested**, representing approximately **44,137 kg of additional live weight** and reported additional revenue of **\$52,965**. The reported feed-cost benefit was approximately **\$289,178.50**.

The total implementation cost was only **\$399.70**, while the presentation reported a total project output/revenue of **\$359,498.50** and an ROI of approximately **\$899.42 for every dollar invested**.

Following the positive results, management approved the use of damaged conveyor belts as replacement straps for the cage sheds. The project was therefore standardized as a practical and sustainable improvement method.



1. INTRODUCTION

The poultry industry requires continuous improvement in production efficiency, bird welfare, feed utilization and overall flock performance. Small operational problems, if not identified and corrected early, can result in significant production losses.

At Wairabetia Farm, the Quality Circle Team identified a significant increase in early chick mortality in the cage shed. The team therefore applied the PDCA approach and Quality Circle tools to identify the root cause, develop an appropriate solution and measure the impact of the improvement.

The project was titled:

“Reducing Mortality in Cage Shed.”

The project focused on reducing 7-day mortality, improving feed conversion efficiency and recovering production performance through a practical and sustainable solution.

1.1 ORGANISATIONAL PROFILE

Future Farms Pte Limited t/a Rooster Poultry operates within the poultry production sector, with the Livestock Department playing an important role in broiler production.

The broiler farm is the value-creation stage of the organisation, where chicks are raised into healthy, uniform and market-ready broilers for processing. The Processing Plant is an internal customer and requires birds that meet required live-weight, uniformity, quality and food-safety standards within the growing period.

The project's presentation identifies customer expectations including:

- Consistent live bird weights.
- Good flock uniformity.
- Smooth processing operations.
- Birds free from disease, residues and physical defects.

Therefore, maintaining good early chick survival is important because mortality directly affects the number of birds available for processing and ultimately influences production efficiency and financial performance.



1.2 BACKGROUND OF THE PROJECT

The cage system at Wairabetia Farm initially performed at a relatively stable level. During the newly commissioned period, the average 7-day mortality was approximately **2.18%**.

However, after several production cycles, the team observed a sharp increase in mortality. During Cycles 3 and 4 of 2025, average 7-day mortality increased to **14.17%**, compared with the original baseline of 2.18%.

The investigation identified that the cage-shed straps had become worn and damaged after approximately five batches. Replacement straps were not readily available locally. The damaged straps created wider openings through which chicks could escape from the cage.

Because the cage system was elevated, chicks falling through the openings could sustain serious injuries or die. This became the major contributor to the increase in early mortality.

The increase in mortality was also associated with deterioration in production performance. FCR increased from an average of **1.74 to 2.76**, while PIF decreased from approximately **264 to 128**.

This created a clear opportunity for improvement.

1.3 OBJECTIVES OF THE PROJECT

The main objective of the project was to reduce 7-day mortality in the cage shed and improve overall production efficiency.

The project established two key targets:

Objective 1 – Reduce 7-Day Mortality

To improve 7-day mortality by **10%** based on historical performance.

Objective 2 – Improve Feed Conversion Ratio

To improve FCR to a target of **1.70**.

The broader objectives were to:

- Identify the major cause of early mortality.
- Develop a practical and low-cost corrective solution.
- Reduce chick losses.
- Improve feed utilization.



- Improve PIF.
- Increase the number of birds available for processing.
- Reduce avoidable production costs.
- Develop a sustainable solution that could be standardized across other cage sheds.

1.4 SCOPE OF THE PROJECT

The project was conducted at **Wairabetia Farm, Lautoka**, with the primary focus on the cage shed, particularly Shed 63.

The scope included:

1. Identification of the high 7-day mortality problem.
2. Analysis of historical mortality data.
3. Investigation of possible causes.
4. Identification of damaged cage-shed straps as a major cause.
5. Development of an alternative replacement material.
6. Trial implementation.
7. Staff training.
8. Monitoring of mortality and production performance.
9. Comparison of pre- and post-project results.
10. Evaluation of financial benefits.
11. Standardization of the successful solution.

The project also considered other possible contributing factors, including chick quality, feed quality, temperature, disease, lighting, brooding management, feed distribution, fan failure and staff skills.

2. PROJECT METHODOLOGY

The project was conducted using the **PDCA – Plan, Do, Check and Act** methodology.

The team also used several Quality Circle tools and techniques, including:

- Brainstorming.
- Gantt Chart.
- Decision Matrix.
- Cause-and-Effect Diagram.
- Flow Charts.
- SMART approach.



- Cost and Benefit Analysis.



These tools helped the team systematically identify the problem, determine the root cause, develop a solution and verify the results.

2.1 PROJECT APPROACH AND PHASES

PLAN

During the Plan stage, the team:

- Identified areas of improvement.
- Brainstormed possible problems.
- Developed a decision matrix.
- Selected the project.
- Set project targets.
- Identified probable causes.
- Applied Quality Circle tools.
- Used the PDCA approach to verify causes.

DO

During the Do stage, the team developed and implemented the selected solution.

The damaged conveyor belts were cut into strips and used as replacement straps for the cage system. Staff were trained and the project was closely monitored.

CHECK

During the Check stage, the team compared performance before and after implementation.

The main indicators monitored included:

- 7-day mortality.
- Live weight.
- FCR.
- PIF.
- Harvest numbers.
- Hatchability and chick quality information.

After confirming positive results, the findings were documented and communicated. Management approved the continued use of damaged conveyor belts as replacement straps for cage sheds.

2.2 PROJECT MILESTONES

The project followed the following general timeline:

Stage	Key Activity	Period
Plan	Problem identification, decision matrix, project selection and target setting	June 2025
Do	Solution development, implementation and execution	July–August 2025
Check	Data collection, comparison and result evaluation	September–October 2025
Act	Review, standardization and future improvement	November 2025

The project journey was documented through a Gantt Chart using the PDCA approach.

3. PROJECT ANALYSIS

3.1 PROBLEM IDENTIFICATION

The problem was identified through brainstorming and review of departmental KPI performance. Three major improvement opportunities were identified:

1. High 7-day mortality.
2. Road access.
3. Damaged conveyor belts.

The decision matrix was then used to determine which problem should receive priority.

High 7-day mortality received the highest score of **24**, followed by damaged conveyor belts with **21** and road access with **19**. Therefore, high 7-day mortality was selected as the 2025 project.



3.2 TARGET SETTING

The project targets were established using the SMART approach:

Specific

The project specifically targeted the reduction of early mortality in the cage shed.

Measurable

Mortality, FCR, PIF, live weight and harvest numbers were measured.

Achievable

The solution was designed around materials and skills available within the organisation.

Relevant

The project directly supported production, quality and departmental KPI requirements.

Time-Based

The project was implemented, monitored and evaluated during the 2025 project period.

The two main numerical targets were:

- Improve 7-day mortality by **10%**.
- Improve FCR to **1.70**.



3.3 CAUSE IDENTIFICATION

The team used a Cause-and-Effect or Fishbone Diagram to identify probable causes of high 7-day mortality.

The causes were grouped under the following categories:

Man

- Lack of skills.
- Chick handling.

Materials

- Chick quality.
- Feed quality.
- Damaged cage-shed straps.

Environment

- High temperature.
- Disease challenge.

Method

- Lighting programme.
- Brooding management.

Machine

- Feed distribution.
- Fan failure.

The investigation identified the **damaged cage-shed straps as the major cause** because the damaged straps created wider openings, allowing chicks to escape from the cages and fall to the ground.



4. SOLUTION DEVELOPMENT

4.1 POSSIBLE SOLUTIONS

After identifying the probable causes, the team brainstormed possible corrective actions.

The solutions included:

- Training staff to improve chick handling and management.
- Strengthening chick-quality checks.
- Improving feed-quality control.
- Maintaining correct brooding temperature.
- Strengthening biosecurity.
- Improving brooding and lighting management.
- Implementing preventive maintenance.
- Improving monitoring of the five basic management requirements.
- Replacing damaged cage-shed straps.

The team then looked for a practical solution that could be implemented quickly and economically.

4.2 SOLUTIONS EVALUATION

The team evaluated solutions based on practicality, available resources, implementation cost and expected benefit.

The project required a solution that:

- Could be implemented using available resources.
- Did not depend on long external supply chains.
- Could be implemented quickly.
- Would protect chicks from falling through cage openings.
- Would reduce mortality.
- Would be cost-effective.
- Could potentially be standardized across the farm.

The team identified damaged conveyor belts as a suitable material that could be reused for this purpose.



4.3 SOLUTION(S) SELECTION

The selected solution was to **reuse damaged conveyor belts by cutting them into approximately 5 cm strips and using them as replacement straps in the cage shed.**

This solution represented a simple but innovative approach to converting an existing waste material into a useful farm resource.

The project concept was:

“With small change leading to bigger impact: reducing chick mortality through a cost-effective and sustainable solution.”

5. PROJECT IMPLEMENTATION

5.1 IMPLEMENTATION PLAN

The implementation was conducted at Wairabetia Farm.

The main implementation activities included:

1. Obtaining approval from the Head of Livestock.
2. Identifying damaged conveyor belts.
3. Cutting the belts into approximately 5 cm strips.
4. Installing the strips as replacement cage straps.
5. Training staff.
6. Closely monitoring cage-shed conditions.
7. Recording 7-day mortality.
8. Monitoring live weight.
9. Monitoring FCR and PIF.
10. Coordinating with the Hatchery Department.
11. Comparing results before and after implementation.

The project was implemented as a controlled trial before the solution was considered for wider application.



5.2 MONITORING AND CONTROL

Monitoring was an important part of the project.

The team ensured that the five basic management requirements were closely monitored:

- Temperature.
- Water.
- Feed.
- Feed distribution.
- Air quality.

The team also emphasized good management practices and close observation of the flock.

The following performance indicators were used:

- 7-day mortality.
- Mortality at harvest.
- FCR.
- PIF.
- Live weight.
- Number of birds harvested.
- Hatchability and chick quality.

The results were then compared between the baseline, problem and trial phases.

5.3 CHALLENGES FACED

The major challenge was the unavailability of replacement cage straps locally after the original straps became worn and damaged.

This created a situation where the farm faced increasing mortality while waiting for suitable replacement materials.

Other potential causes also had to be considered before confirming the root cause. These included chick quality, feed quality, temperature, disease, lighting, brooding management, feed distribution, fan performance and staff skills.

The team therefore needed to ensure that the reduction in mortality was not simply the result of another change in farm management.



To address this, the team coordinated with the Hatchery Department to review chick quality and hatchability information and maintained close monitoring during the trial.

6. PROJECT IMPLEMENTATION RESULTS

6.1 TANGIBLE RESULTS

The project produced significant measurable improvements.

7-Day Mortality

The baseline average mortality was **2.18%**.

During the problem phase, average mortality increased to **14.17%**.

After implementation, mortality reduced to:

- Cycle 5: **1.96%**
- Cycle 6: **0.98%**
- Trial average: **1.47%**

The trial average therefore performed better than the original baseline of 2.18%.

Mortality at Harvest

During the problem phase, average mortality at harvest was reported at **55.61%**, compared with the trial-phase figure of **7.28%**.

The trial phase also achieved the highest number of harvested birds at **49,816 birds**, despite having the lowest average intake across the compared phases.

The project reported an additional **24,521 birds harvested** during Cycles 5 and 6 compared with the problem phase.

FCR Improvement

FCR improved from an average of **2.76** during the problem phase to **1.50** during the trial phase.



This represented a major improvement in feed utilization.

PIF Improvement

PIF improved from an average of approximately **127.80** during the problem phase to approximately **312.80** during the trial phase.

Production Increase

The project reported:

- **24,521 additional birds harvested**
- **44,137 kg additional live weight**
- **35,310 kg additional dressed weight**
- **\$52,965 additional revenue**

The project also reported feed savings of approximately **222,445 kg**, valued at approximately **\$289,178.50**.

Cost and Benefit

The total project implementation cost was reported as **\$399.70**.

This included:

- Two knives: \$8.00
- Damaged conveyor belt: \$8.00
- Labour for cutting: \$195.85
- Labour for installation: \$195.85

The presentation reported total revenue of **\$342,143.50** and a net profit of **\$341,743.80**.

The presentation also reported total output of **\$359,498.50** and an ROI of approximately **\$899.42 for every dollar invested**.

6.2 INTANGIBLE RESULTS

In addition to the measurable financial and production benefits, the project produced several intangible benefits.



Improved Teamwork

The project strengthened teamwork between Quality Circle members and farm staff.

Increased Employee Engagement

Employees were directly involved in identifying the problem, implementing the solution and monitoring the results.

Improved Problem-Solving Culture

The project demonstrated that farm problems can be addressed systematically using data, Quality Circle tools and PDCA methodology.

Increased Staff Awareness

The project improved awareness of the importance of early chick management, cage condition and continuous monitoring.

Waste Reduction

The project created a productive use for damaged conveyor belts rather than treating them only as waste material.

Improved Continuous Improvement Culture

The project encouraged staff to look for practical improvements that can produce significant operational benefits with limited investment.

The presentation specifically identifies teamwork, people engagement and achievement of set targets as key intangible results.

6.3 SUSTAINABILITY PLAN

To sustain the improvement, the following actions should continue:

1. Regularly inspect cage straps before chick placement.
2. Replace damaged straps immediately.
3. Maintain an adequate stock of prepared replacement strips.



4. Continue monitoring 7-day mortality.
5. Continue monitoring FCR and PIF.
6. Include cage-strap condition in routine shed inspections.
7. Train new staff on cage-shed inspection and chick handling.
8. Continue applying the five basic management practices.
9. Maintain preventive maintenance programmes.
10. Document the process as a standard operating practice.
11. Share the successful practice with other cage sheds.
12. Review project performance regularly to identify further improvement opportunities.

Following the positive project results, management approved the use of damaged conveyor belts to replace worn-out straps in the cage sheds, allowing the improvement to be standardized.

7. LESSONS LEARNED

7.1 KEY TAKEAWAYS

The project provided several important lessons.

1. Small Problems Can Create Major Losses

A relatively simple issue such as damaged cage straps resulted in significant bird mortality and production losses.

2. Data Helps Identify the Real Problem

Historical mortality, FCR and PIF data helped the team identify the seriousness of the problem and measure the impact of the corrective action.

3. Root Cause Analysis Is Important

The Fishbone Diagram helped the team consider different possible causes before identifying damaged cage straps as the major contributor.

4. Innovation Does Not Always Require High Investment

The project demonstrated that an existing damaged material could be repurposed to solve an operational problem.



5. Employee Involvement Improves Solutions

The participation of farm employees helped the team understand the practical problem and develop a solution suitable for actual farm conditions.

6. PDCA Provides a Structured Improvement Process

The Plan, Do, Check and Act methodology helped the team move from problem identification to implementation, verification and standardization.

7. Monitoring Must Continue After Implementation

A solution should not be considered successful only because it works initially. Continued monitoring is required to ensure that the improvement is maintained.

7.2 RECOMMENDATIONS

Based on the project findings, the following recommendations are made:

1. Conduct routine inspections of cage straps before every batch.
2. Maintain sufficient replacement straps or prepared conveyor-belt strips on site.
3. Include cage strap condition in the farm's preventive maintenance checklist.
4. Train all relevant staff on identifying damaged straps.
5. Continue monitoring 7-day mortality as an early warning indicator.
6. Continue monitoring FCR and PIF to ensure production improvements are sustained.
7. Continue working closely with the Hatchery Department on chick quality and hatchability.
8. Standardize the successful conveyor-belt strap solution across other suitable cage sheds.
9. Record all improvements and corrective actions for future Quality Circle projects.
10. Continue using Quality Circle methodology to identify other production losses.
11. Evaluate the condition and performance of the replacement straps over several production cycles.
12. Consider the next improvement opportunity identified by the team: **damaged conveyor belts**, as recorded in the project's priority list.



8. CONCLUSION

The “**Reducing Mortality in Cage Shed**” project undertaken by Quality Circle Team STRAPS successfully addressed a significant production problem at Wairabetia Farm.

The project began with a sharp increase in 7-day mortality from a baseline average of approximately **2.18%** to **14.17%** during the problem phase. Through systematic investigation, the team identified damaged cage-shed straps as the major cause of chicks escaping from the cages and sustaining fatal injuries.

Instead of waiting for conventional replacement straps, the team developed a simple and innovative solution by reusing damaged conveyor belts. The belts were cut into approximately 5 cm strips and installed as replacement cage straps.

The results demonstrated a substantial improvement. Average 7-day mortality during the trial reduced to **1.47%**, below the original baseline of 2.18%. FCR improved from **2.76 to 1.50**, while PIF increased from approximately **127.80 to 312.80**. The project also contributed to additional bird harvests, increased live weight, feed savings and significant reported financial benefits. The project also demonstrated the value of teamwork, employee engagement, innovation, waste reduction and continuous improvement. Most importantly, the solution required only a small investment of **\$399.70**, demonstrating that significant operational improvements can be achieved through practical ideas and effective use of available resources.

Following the successful trial, management approved and standardized the use of damaged conveyor belts as replacement straps for cage sheds.

Overall, the project demonstrates that **continuous improvement, when supported by data, teamwork, structured problem-solving and practical innovation, can create significant improvements in production performance and organizational value.**