RFID Portal Test

Rfscl Laboratory UNL

RFID portal test introduction

- 2. develop warehouse management .
- 3. tracked more accurately through the portal dock door in real time .
- 4. improve performance of antennas and increase effective read rate under specific conditions.

Overview

• Two experiments

- Effectiveness and readability test: Search for reliable test data on the effectiveness in reading RFID tags under different practical usage conditions.
- *Full read rate experiment*: Figure out qualified conditions and specifications for when a customer wants 100% readability.



• Experiment 1:

Antennae position Tag placement Read range Antenna selection

• Key point:

Figure out which factors influence the readability of the antennae.

Experiment 2:

- Accuracy
- Readability
- Distance

Key point:

Optimum position of tags, antennas, and portal. Recommendations of improving RFID performance

Test description

- Exam the performance of RFID system.
 - Yield
 - Variance
 - Label types
 - Label placement
 - Antenna distance

Experiment necessities



Alien Squiggle

Experiment necessities



Matrics Antenna

Experiment design

• Experiment 1:

- Tag placement: Top, Front, Side
- *Number of items:* One item, three items, six items, ten items
- *Number of Antennae:* One antenna and two antennas (on each side of portal)
- * Two antenna were only used in one trial within the experiment

Experiment design

• Experiment 2:

- *Tag placement*: Tags put on every item on up, side and front.
- *position of antennas:* The same height on each side / The different height (3 ft, 5 ft) on each side
- *The distance between each side of portal:*5 ft / 7 ft

Experiment results and analysis







• Premium performance is tags on side .

1 Antenna V.S 2 Antenna



• 80% V.S 100%

• Tag's quantity (Only in experiment 1)

The larger the quantity of items was, the poorer the readability of the antenna would be .

Antenna's position (Only in experiment 2)

- Placed in different horizontal line have positive affect on readability.
- Portal dock's position (Only in experiment 2)
 - The shorter the distance is, the better read efficiency would be.

Conclusion

- full-read expectation under these under the specification :
- Distance between each side of portal: 6-8 feet. (Experiment 2)
- Tag placement: on side.

The reading rate and premium reading scale

- specification of 10 tags per pallet
- between 2-3 feet around the middle line
- reading rate : 90% or more

*Frequency, distances and angles, type of tag, location and replacement, influences of moisture and metals, and pallet patterns all played a part in readability.





Recommendations and summary

- The 100% readability standard could be tough to meet, but some requirements still could be applied to satisfy the customer's specific needs.
- Total conditions for receiving more than 90% readability