Framework for Applying RFID Tags in Tyre Industry

8/2017

1   Introduction

Tyre manufacturing process is lean and efficient. Adding new technologies, such as RFID, may affect the process and cause additional work. This document describes a framework that enables companies to take RFID-specific factors into consideration. Additionally, the document shows how a company-specific RFID tagging specification can be efficiently used along the process to ease decision making.

2   Impact of Use Cases on RFID Tyre Tag Specifications

RFID can be implemented on a tyre in various ways: embedded, patch or sticker type. Once a tyre is RFID enabled, there are countless ways to utilize the tag, most often referred to as "use cases". Thus, preparing the tagging specification according to the actual use cases within the complete tyre value chain is an important step, which later leads the correct types of RFID tags and production methods to be utilized.

Advanced RFID use cases require higher sensitivity tagging

Trivial   Advanced   Doable (so they say)

The use cases in tyre manufacturing, distribution, sales, usage and maintenance differ a lot. Reading a tag in a single tyre is relatively easy, even trivial, and does not pose high performance requirements from the tagging, because in most cases the read distance is short and nothing stands between the reader and the tyre.

However, in typical environments within the distribution channel there are usually multiple tyres in piles, stacks, wall mounts or even in enormous heaps. If all tyres are to be RFID scanned in such use cases, it sets completely different requirements on the performance of tagging, which should be taken into consideration when preparing the tagging specifications.

3   Generic Framework for Successful Implementation of RFID

Understand use cases ➤ Identify process limitations ➤ Compile specification ➤ Select tagging solution ➤ Implement tagging

Start by Understanding the Use Cases

- What problems are you going to solve with RFID? We suggest you include your distribution partners, even the most important of end uses in this dialogue. What is the financial impact of these problems?
- What does the practical implementation look like? Some use cases are in-house, some are shared, some may be partner-specific.
- Are the tyres in close proximity to each other? What are the read angles to the reader?
- As a result you've got the read range specified (in meters), that are translated into read sensitivity (in dBm).

Understand What Would Work in Your Manufacturing Process

- Instead of adding process steps, you may want to expand an existing process step to include tagging
- Pinpoint the process nodes where RFID quality control still can prevent non-functional components from reaching the final product.

Combine Your Read Sensitivity Requirement with the Industry Specific Tagging Standards

- The upcoming ISO standard family specifies the EPC Class 1 Gen2 protocol, life time of the tag, IC data structure, and operational conditions of the tag. It's a really good idea to follow the standard instead of doing something proprietary, that often turns out expensive in the long run.
- Add your read sensitivity requirement, and you've got your tyre RFID specification completed!

Select and Validate the Proper Tagging Solution against Your Specification

- Use dedicated RFID test equipment to compare different tags from several vendors.
- Select and validate suitable tags against your specifications. You probably want to find at least a couple of vendors.
- Consult technology vendors to make sure the tags can be tested for quality in the process nodes that you've pinpointed without slowing down the production throughput.

Voyantic Taiwan Office
APAC Director_Mr. Smoos PENG
亞太區總監_彭 建 賓 先生
✉ smoos.peng@voyantic.com
☏ +886 (0)933 407 457 (TW)
Scan Smoos WeChat QR Code >>>

Implement Tagging in Your Production

- As you're ramping up the RFID tagging, you may want to have a few additional quality test nodes to make sure all goes smoothly. Naturally the tests should correlate with your tagging specs!
- Make sure your quality test nodes include test log files/database with EPC's recorded that you can rely on for monitoring and process improvements
- Over time you can reduce the number of quality control nodes to reduce operational costs.

Do you agree with us on this framework? We would love to hear your comments and feedback, so drop us a line at *info@voyantic.com*!