

CASE STUDY

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Large mining operator in Mozambique for its vehicles, a RFID-enabled pilot TYRE MANAGEMENT SYSTEM

Automated identification of tyres issued to vehicles

Accurate matching and verification of tyres with the
vehicles to which they have been issued

Prevention of tyre theft and wrongful exchange

Automated reports and history as well as improved
lifecycle management



INSIDE:

Key Requirements
Solution
Implementation
Working
Benefits
Links

TECHNOLOGY

Solution:

EPC Gen2 compliant tyre
tracking and management solution

Tag Type:

Parka™ UHF Passive
Tyre Tag

Reader/Antenna:

Xtenna™
HandyScanna™

Method:

Single Tracking via hand-held or
mounted Reader/Antenna device

Integration Platform:

RFID Middleware:

Xtenna™ WebToolkit
Xtenna™ Studio

Application: Essen RFID's
Tyre Management System

Database: SQL Server 2005 Exp. ed.

Tag Manufacturer/Supplier:

Essen RFID, with US based chip inlay

Reader/Antenna Manufacturer:

Essen RFID, with US based module

Systems Integrator:

Essen RFID

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KEY REQUIREMENTS:

The company is a huge mining concern operating in Mozambique having a fleet of heavy-duty trucks and other vehicles that carry material over extremely rough terrain. With a fleet of around a 1000 vehicles, many of whom are trailer-trucks having 14 wheels, there is continuous vehicle movement in the mine and consequent heavy wear and tear on the tyres of these vehicles. The company issues a fresh set of tyres to each vehicle when the old ones are worn out as per their lifecycle.

The company faced a situation where old tyres were being reused after being retreaded, even when it has supplied the vehicle with a new set of costly tyres. This resulted in both a financial loss as well as impacting on operational efficiency. To prevent this occurrence the company needed an automated solution that would easily track and verify the tyres that had been issued to each vehicle at any point of time, ensure that they were fitted on the same vehicle that they were supposed to and prevent theft and cheating from taking place.

Main challenges:

- Distinct identification of each vehicle based on unique parameters.
- Tracking any particular vehicle and the tyres issued to that vehicle.
- Tracking if any previously assigned tyre is missing and has been replaced with an old tyre.
- Ascertaining theft of tyre and from which vehicle the tyre is missing.
- Maintaining a history of all vehicles and tyres assigned to them.

SOLUTION:

Essen RFID proposed an efficient RFID-based tyre tracking and management solution for the company's vehicles. This system utilizes RFID tags that are affixed to each vehicle and tyre, and mounted Xtenna™ reader-antennas as well as hand-held HandyScanna™ reader devices to identify and track vehicles and the tyres that have been assigned to them.

IMPLEMENTATION:

A PARKA™ RFID tag is issued to each vehicle of the company. This enables each of these vehicles along with their full details to be associated with a unique tag ID in the database. A RFID Tyre tag is affixed to each tyre when it is allotted to the vehicles. A hand-held HandyScanna™ device is used assigning tags into the database, for identifying and tracking vehicles, as well as tyre identification and tracking. A mounted Xtenna™ reader-antenna is also utilized for reading these tags without requiring human presence. The HandyScanna™ deploys a mobile-based application that maintains the tracking system and communicates with the central server through Wi-Fi. SQL Server is used as the back-end database.



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WORKING:

1. A PARKA™ RFID tag is affixed to each vehicle of the company.



2. The tag is then assigned to that vehicle in the database using the hand-held HandyScanna™ device along with full vehicle details.



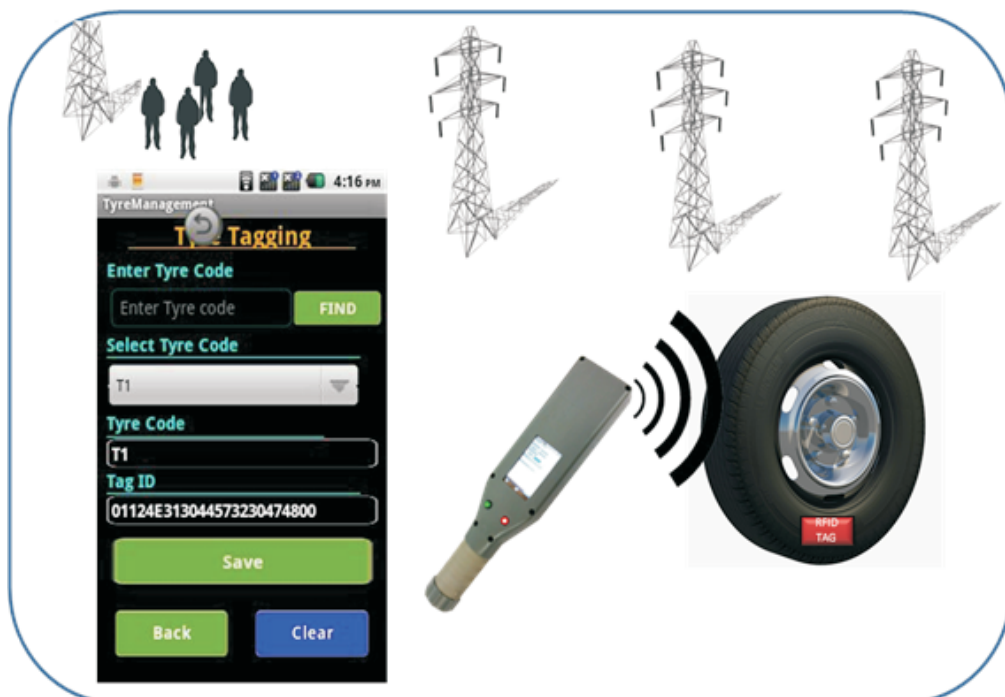


CASE STUDY

- Likewise, a RFID Tyre tag is fixed to each new tyre that is issued to any of the above registered vehicles of the company.



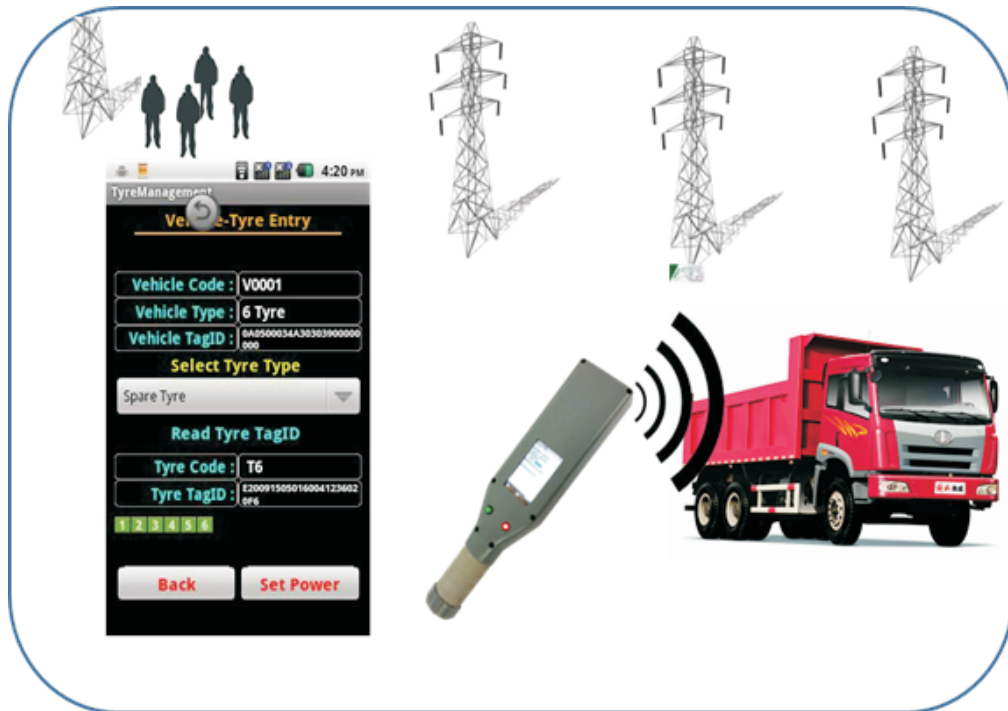
- Each tyre is also registered into the database by the HandyScanna™ device along with its details and specifications.



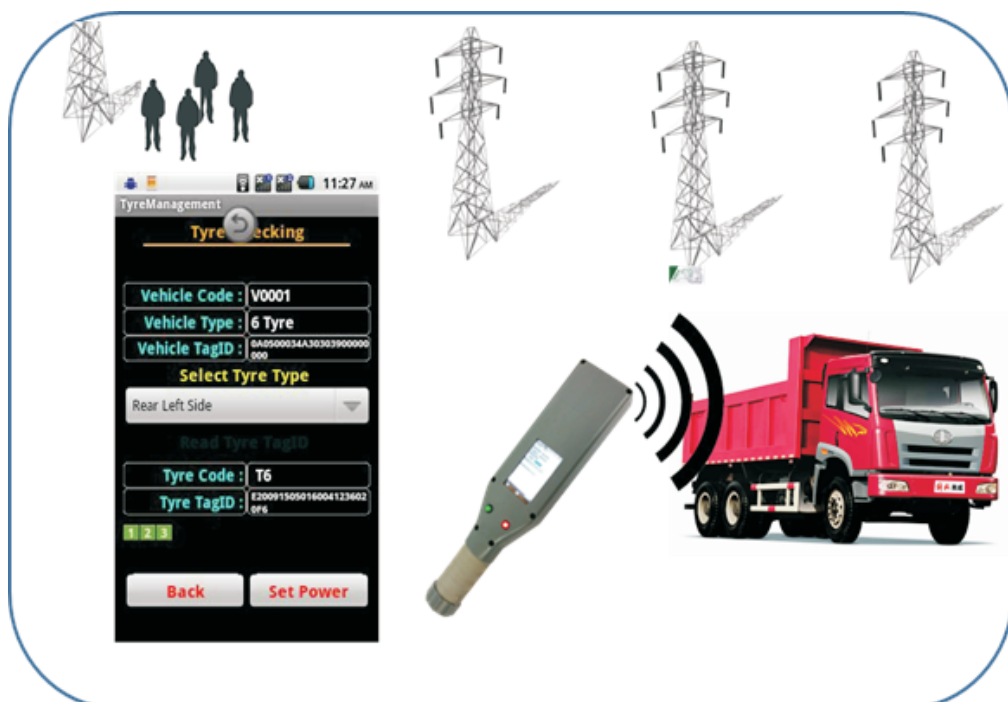
- Next the tyres are assigned in the database to the vehicles to which they have been issued, including the spare tyres in the set. The hand-held screen indicates the number of tyres assigned to the vehicle.



CASE STUDY



5. The system also allows selecting the position of each tyre, whether front or rear, left or right, etc.
6. Vehicles arriving at the company go through a platform where Xtenna™ devices have been mounted. The Xtenna™ reads the tags of the vehicle and its tyres.





CASE STUDY

7. The vehicles and their respective tyres can also be manually scanned using the hand-held HandyScanna™ device.
8. The system identifies the tags that are being read and indicates if any tyres assigned to that vehicle are missing.
9. The system also identifies if the tag of another tyre belonging to a different vehicle is found on the vehicle currently on the platform.
10. The system therefore easily provides details of vehicles and associated tyres, and alerts if there have been any changes made after tyre allotment.

Flow Diagram

Enter all the necessary details related to the vehicles using the desktop application or the HandyScanna™, such as chassis no., etc.



Enter all the necessary details related to the tyres, such as tyre model, type, lifespan, etc.



Assign PARKA™ tags to each vehicle and Tyre tags to each tyre using HandyScanna™ or desktop application.



Assign the tyres to their respective vehicles in the database of the Tyre Tracking System.



Synchronize data between desktop and HandyScanna™ device.



Tyres can now be tracked for each vehicle. When the vehicle arrives at the platform, the vehicle and tyre tags are read by Xtenna™ and matched with each other.



Scanning can also be done manually with the HandyScanna™.



If vehicles and tyres do not match, a red light flashes on the platform.



CASE STUDY

Tyre Tracking System Desktop Modules:

Vehicle Master:

Necessary details regarding the vehicle such as vehicle ID/code, type, chassis number, registration licence plate number, etc. are entered here.

TYRE MANAGEMENT SYSTEM Version:1.0.0.0 User:admin Xtenna Studio™

Actions

- Masters
 - Tyre Master
 - Model Master
 - Vehicle Master
 - Tyre Position
 - User Management
 - Role Mapping
- RFID Settings
 - Location Group Master
 - Location Master
 - RFID Readers Dev
 - Admin Tasks
 - Import Data
 - HandyScanna
 - Vehicle Dashboard

Vehicle Details in grid view:

VEHID	VEHCODE	DESCRIPTION	CHASSISNO	TAGID	MANUFACTURER	VEHICLE_TYPE	CREATED_BY	CREATED_ON	MODIFIED_BY	MODIFIED_ON
1	V9901	V9901	ABCEFFGHIL000001	0B0400074630315230320000	tata	6 WHEELER	admin	05-06-2013 6:05 PM		
2	V9902	V9902	ABCEFFGHIL000002	01124E313044564442525000	tata	4 WHEELER	admin	05-06-2013 6:06 PM		

Data Entry Form:

Vehicle Code: V9902
Vehicle Description: V9902
Chassis_No: ABCEFFGHIL000002
Model: heavy loader
Manufacturer: tata
Vehicle Type: 4 WHEELER
Device IP: 192.168.123.147
Tag ID: 01124E313044564442525000
System ID:

Buttons: OK, Cancel, Clear, Export To Excel, Read Tag, Clear Tag

DeviceIP: 192.168.123.147
Status Time: 14:33:47
Device IP: 192.168.123.147 is

Application Log

Tyre Master:

Necessary details regarding each tyre such as tyre code, manufacturer, lifespan, etc. are entered here.

TYRE MANAGEMENT SYSTEM Version:1.0.0.0 User:admin Xtenna Studio™

Actions

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TYRE Details in grid view:

TYRE_ID	TYRE_CODE	MODEL	TAG_ID	MAKE	LIFESPAN	IS_ACTIVE	CREATED_BY	CREATED_ON	MODIFIED_BY	MODIFIED_ON	DELETERFLAG
1	T1	ZAPPER	0B05000A4A31303941000000	MRF	1		admin	05-06-2013 6:09 PM	anoopa	05-06-2013 11:38 PM	
2	T2	PLADI	0B0600074630315230320000	MRF	1		admin	05-06-2013 6:10 PM	anoopa	05-06-2013 11:39 PM	
3	T3	ZAPPER	E200FF0163FF4E3200000044	MRF	1		admin	05-06-2013 6:13 PM	anoopa	05-06-2013 11:39 PM	
4	T4	ZAPPER	0B0600094630315230340000	MRF	1		admin	05-06-2013 6:13 PM	anoopa	05-06-2013 11:40 PM	
5	T5	ZAPPER	0B0600094A4A31303942540000	MRF	1		admin	05-06-2013 6:13 PM	anoopa	05-06-2013 11:42 PM	
6	T6	ZAPPER	0B07001B4A31303941530000	MRF	1		admin	05-06-2013 6:13 PM	anoopa	05-06-2013 11:43 PM	

Data Entry Form:

Tyre Code: T1
Manufacturer: MRF
Tyre Model: ZAPPER
Tyre Lifespan: 1
Device IP: 192.168.123.147
Tag ID: 0B05000A4A31303941000000
System ID:

Buttons: OK, Cancel, Clear, Export To Excel, Read Tag, Clear Tag

DeviceIP: 192.168.123.147
Status Time: 14:45:28
Device IP: 192.168.123.147 is

Application Log

Tyre Position:

Tyre positions such as front, rear, left, right, etc. can be entered here for a particular tyre that has been assigned to a vehicle.

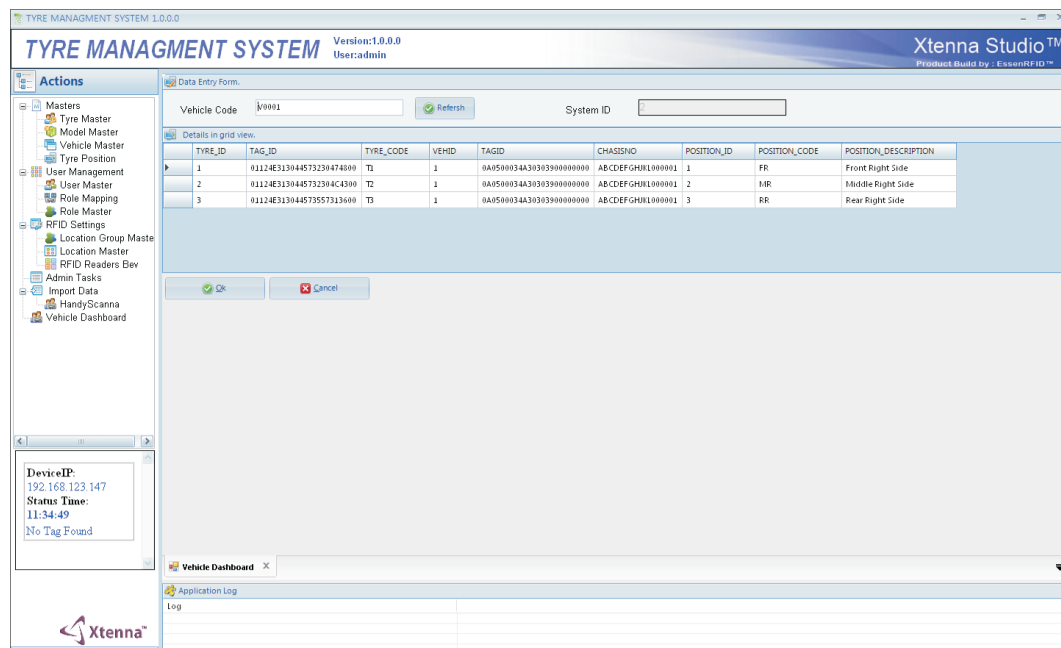


CASE STUDY

Desktop Dashboard Module:

This module provides a display of which tyres are presently attached to any particular vehicle. When a vehicle arrives at the reading platform, the reader reads the vehicle and tyre tags and displays these details in the module grid.

The tyres that have been assigned to the particular vehicle will be okayed in green whereas those that are not assigned or are missing will be displayed with a red light.



TYRE_ID	TAG_ID	TYRE_CODE	VEHID	TAGID	CHASSNO	POSITION_ID	POSITION_CODE	POSITION_DESCRIPTION
1	0112HE313044573230474090	T1	1	0A0500034A30303900000000	AB.CDEF.GHIJ.L0000001	1	FR	Front Right Side
2	0112HE3130445732304C4390	T2	1	0A0500034A30303900000000	AB.CDEF.GHIJ.L0000001	2	MR	Middle Right Side
3	0112HE313044573557313690	T3	1	0A0500034A30303900000000	AB.CDEF.GHIJ.L0000001	3	RR	Rear Right Side

BENEFITS:

- Accurate vehicle and tyre identification.
- Easy tracking of tyres that have been issued to any particular vehicle.
- Easy spotting of unregistered replacement tyre and the vehicle from which the new registered tyre is missing.
- Prevention of theft of costly heavy-duty tyres.
- Facilitates systematic replacement of tyres as per their lifespan.
- Accurate judgement of tyre turnover and improved stock-keeping.
- Quick automated verification through RFID is labour-saving and free of bias.
- Improved efficiency due to prevention of reusage of unreliable old tyres.
- Automated report generation and history record maintenance.



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LINKS:

Hardware:



Tags:



TYRE TAG

Software:



Reference Example:

<http://www.essenrfid.com/Mailer/accessparking-flash-demo.pdf>