



DEEPAK FERTILISERS
AND PETROCHEMICALS
CORPORATION LIMITED



Well-known chemical industry corporation adopts for its dispatch operations, a RFID optimized TRUCK TRACKING SYSTEM

Automatic and efficient tracking of truck movement within
plant premises

Efficient queuing and minimizing of waiting time

Optimum utilization of loading bays and weighbridges

Automated dispatch processing, trip data management
and seamless backend integration with existing ERP



INSIDE:

Key Requirements
Solution
Implementation
Working
Benefits
Links

TECHNOLOGY

Solution:

EPC Gen2 compliant
vehicle tracking solution

Tag Type:

Parka™ UHF Passive

Reader/Antenna:

Xtenna™
Xtenna Proximity™

Method:

Multiple Tracking via Integrated
Reader/Antenna modules

Integration Platform:

RFID Middleware:

Xtenna™ WebToolkit
Xtenna™ Studio

Application: Essen RFID's Truck
Logistics System

Database: SQL Server 2012

ERP: SAP

Tag Manufacturer/Supplier:

Essen RFID, with US based chip inlay

Reader/Antenna Manufacturer:

Essen RFID, with US based module

Systems Integrator:

Essen RFID

For further details contact:

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Nariman Point
Mumbai 400021 India
www.essenrfid.com





CASE STUDY

KEY REQUIREMENTS:

Deepak Fertilisers and Petrochemicals (DFPCL) is a leading producer of industrial chemicals and fertilizers in India. From its plant at Taloja near Mumbai, its various products are manufactured, packed in bags and sent to distributors. The company utilizes a fleet of trucks for product distribution, consisting of both, permanent and temporarily contracted vehicles. These trucks are booked by the company's transport department and called to the plant when required as per the truck's distribution destination. This requisition and dispatch process needed to be automated and streamlined as truck movement within the plant area was inefficient with truck drivers availing of additional waiting time, resulting in loading bay underutilization and delays.

Main challenges:

- Knowing how many trucks were lined up and waiting outside the plant gates for entry into the premises.
- Efficient utilization of all loading bays for loading dispatch goods with least waiting time for the trucks.
- To track the availability of suitable loading bay for each truck.
- To manage and guide the truck drivers so they can reach their allotted loading bay within minimal period of time.
- To automate the process of detection and loading of trucks within the company premises.
- Determining the time spent by the trucks at each touch point within the plant.
- Generating a token as a unique code for each truck, helping in identification and the ascertaining current status of the truck within the premises.
- Information sent to truck drivers through SMS during token generation, regarding estimated time before loading of material.
- Reduction in time spent by dispatch office in ascertaining required trucks available which have reported for loading and bringing down the waiting time of these trucks outside the plant.
- Instant information and alerts to administrator regarding current status and waiting queue at each loading bay.
- Tracking history of trucks pertaining to timings, documentation, and details of vendors, materials, trips, etc.

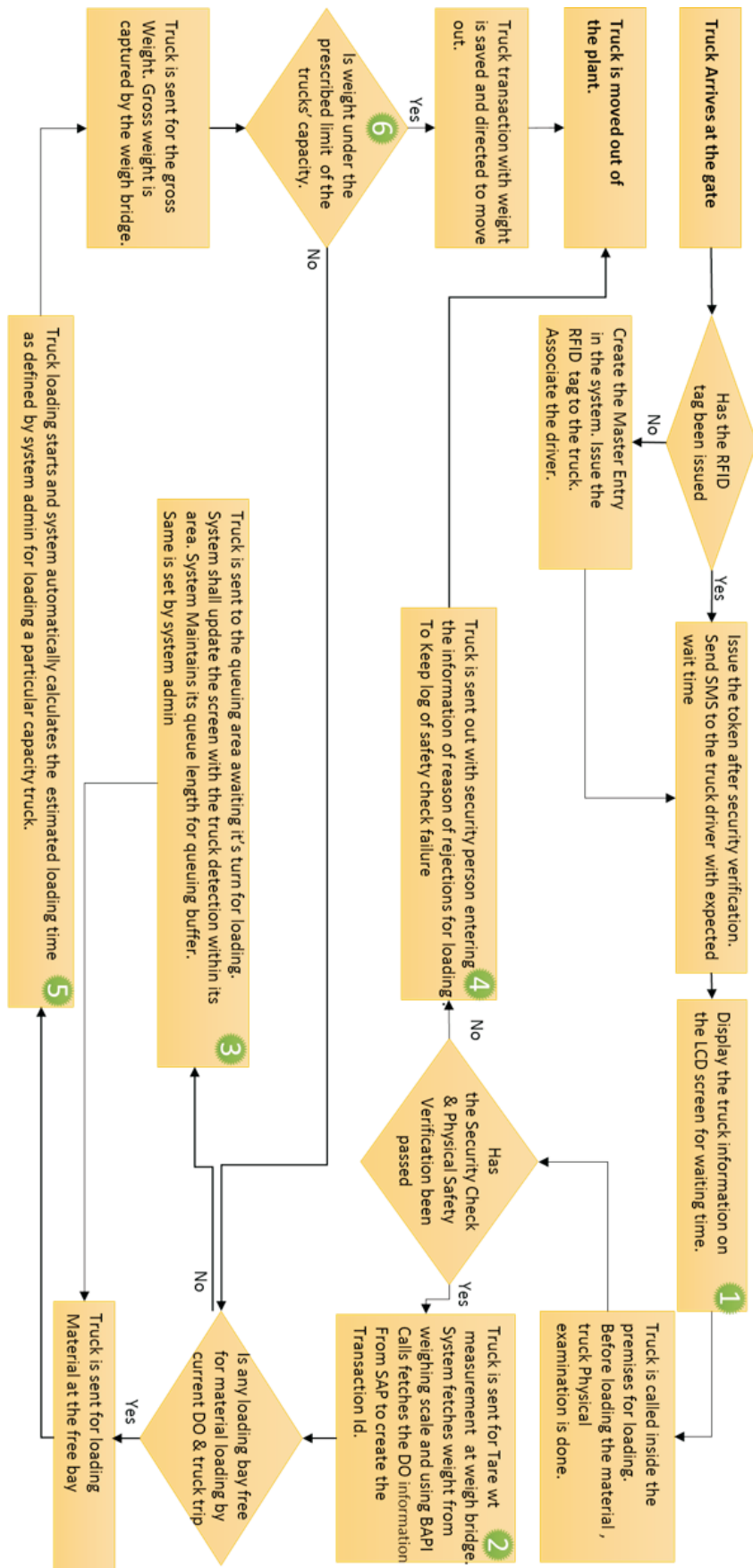
SOLUTION:

Essen RFID offered an efficient solution for truck tracking and transit management based on RFID, that would track the delivery trucks at each touch point starting from issuing of token till the loaded truck moves outside the plant, while minimizing waiting period for loading of goods. It involved the use of RFID tags on the vehicles and deployment of integrated antenna-readers at the various touch points within the plant. The solution is implemented through SQL Server 2012 as the database with backend ERP integration through SAP.



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Operation Flow:





CASE STUDY

IMPLEMENTATION:

A PARKA™ RFID tag is issued to each truck when it receives a token number on entering the premises. These tags are registered into the database using Xtenna Proximity™ readers. Xtenna™ antenna-readers for detecting truck movement are mounted at each touch point within the plant, such as entrance/exit gates, weighbridges, queuing area and loading bays. LCD displays are mounted at all the truck queuing areas.

The entire tracking process is controlled through Essen RFID's Truck Logistics System.

WORKING:

Modules:

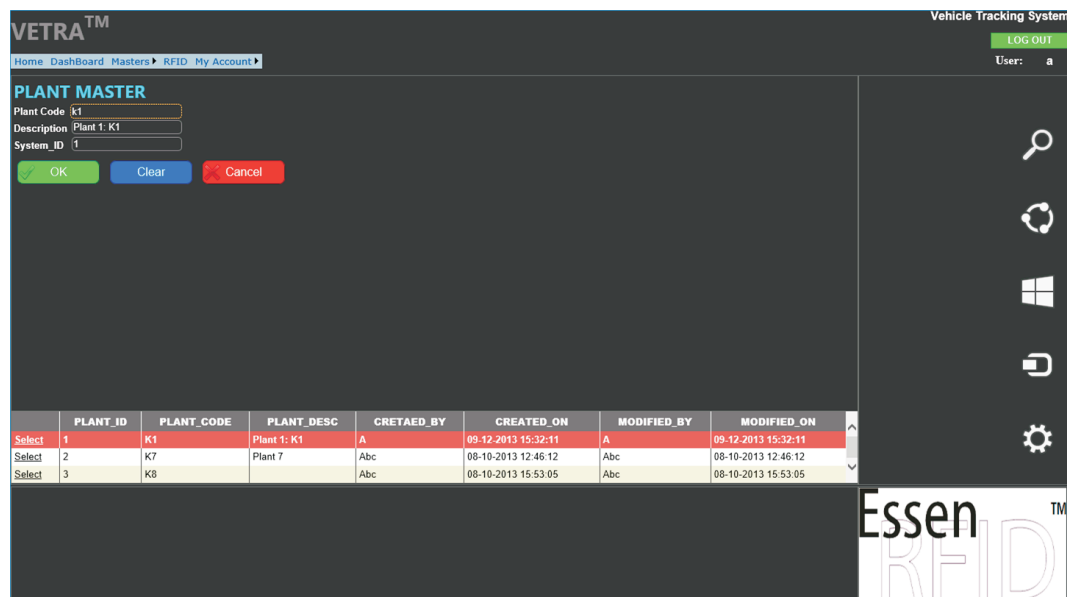
The Truck Logistics System has the following main modules:

- Registration
- Mapping Modules
- Dashboard

Registration Module:

This module is used to register the truck, driver and other important entities into the RFID system. The main masters used in this module are:

Plant Master: This is used to register the various plants within the company premises along with data such as plant name, description, etc.



VETRA™ Vehicle Tracking System

Home Dashboard Masters ▶ RFID My Account ▶

LOG OUT User: a

PLANT MASTER

Plant Code:

Description:

System_ID:

| | PLANT_ID | PLANT_CODE | PLANT_DESC | CRETAED_BY | CREATED_ON | MODIFIED_BY | MODIFIED_ON |
|--------|----------|------------|-------------|------------|---------------------|-------------|---------------------|
| Select | 1 | K1 | Plant 1: K1 | A | 09-12-2013 15:32:11 | A | 09-12-2013 15:32:11 |
| Select | 2 | K7 | Plant 7 | Abc | 08-10-2013 12:46:12 | Abc | 08-10-2013 12:46:12 |
| Select | 3 | K8 | | Abc | 08-10-2013 15:53:05 | Abc | 08-10-2013 15:53:05 |

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Location Master: This is used to register the various truck-stop locations within each plant, such as Token Issue, Tare Weighbridge, Loading Bay, Gross Weighbridge, etc.

VETRA™ Vehicle Tracking System
Home Dashboard Masters RFID My Account
LOG OUT
User: a

LOCATION MASTER

Location Name:
Description:
System_ID:
OK Clear Cancel

| | LOCATION_ID | LOCATION_NAME | LOCATION_DESC | CREATED_BY | CREATED_ON | MODIFIED_BY | MODIFIED_ON |
|--------|-------------|---------------|---------------|------------|---------------------|-------------|---------------------|
| Select | 1 | TOKEN | TKN | Abc | 07-10-2013 18:01:30 | Abc | 07-10-2013 18:01:30 |
| Select | 2 | IN | ING | Abc | 30-09-2013 14:21:38 | Abc | 30-09-2013 14:21:38 |
| Select | 3 | TARE_WEIGHT | TRW | | | | |
| Select | 4 | LOADING_BAY | BAY | Abc | 07-10-2013 18:01:53 | Abc | 07-10-2013 18:01:53 |
| Select | 5 | GROSS_WEIGHT | GRW | | | | |
| Select | 6 | OUT | OUT | | | | |
| Select | 7 | QUEUE | QUEUE | | | | |

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Vendor Master: Here the vendors (transporters) available with the company are registered into the database along with their name, address and other contact details.

VETRA™ Vehicle Tracking System
Home Dashboard Masters RFID My Account
LOG OUT
User: a

VENDOR MASTER

Vendor Name:
Description:
Contact_No:
System_ID:
OK ClearAll Cancel

| | VENDOR_ID | VENDOR_NAME | VENDOR_DESC | VENDOR_CONTACT | CREATED_BY | CREATED_ON | MODIFIED_BY | MODIFIED_ON |
|--------|-----------|-----------------|-------------|----------------|------------|---------------------|-------------|---------------------|
| Select | 2 | J.K TRANSPORTER | | 9619222776 | Abc | 08-10-2013 14:07:20 | Abc | 08-10-2013 14:07:20 |
| Select | 3 | Kk Transporter | | 977323423894 | Abc | 08-10-2013 14:23:35 | Abc | 08-10-2013 14:23:35 |
| Select | 4 | TT TRANSPORTER | | | Abc | 08-10-2013 14:24:53 | Abc | 08-10-2013 14:24:53 |
| Select | 5 | Sdfsdf | | 124456790 | A | 13-11-2013 13:02:02 | A | 13-11-2013 13:02:02 |
| Select | 6 | Asd | | | Abc | 08-10-2013 15:20:56 | Abc | 08-10-2013 15:20:56 |

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Driver Master: Using this, the driver of the truck is registered into the database along with necessary details such as driver's name, driver's address, driving license number, etc.

Truck Master: Each truck is registered into the database along with its details such as license plate number, truck driver, vendor (transporter/truck owner), truck's maximum carrying capacity, etc.

VETRATM Vehicle Tracking System

Home Dashboard Masters ▶ RFID My Account ▶

LOG OUT User: a

TRUCK MASTER

License Plate No.

Description

Vendor Name

Driver Name

Truck Max Capacity(Kg.)

System_ID

| | TRUCK_ID | LICENSE_PT_NO | TAG_ID | TRUCK_DESC | VENDOR_NAME | DRIVER_NAME | MAX_CAPACITY | CREATED_BY | CREATED_ON | MODIFIED_BY |
|--------|----------|---------------|--------|------------|-----------------|---------------|--------------|------------|---------------------|-------------|
| Select | 1 | Mh-06-Ba-4759 | E0001 | Truck 1 | TT TRANSPORTER | Kartar Singh | 30000 | System | 29-10-2013 17:22:37 | System |
| Select | 2 | Mh-06-Js-1111 | E0002 | Truck 2 | Kk Transporter | Raju Satankar | 30000 | System | 29-10-2013 18:06:46 | System |
| Select | 3 | Mh-01-Kj-8443 | E0003 | Truck 3 | J K TRANSPORTER | Kartar Singh | 20000 | System | 29-10-2013 18:07:13 | System |
| Select | 4 | Mh-02-Li-9999 | E0004 | Truck 4 | Kk Transporter | Raju Satankar | 30000 | System | 29-10-2013 18:07:35 | System |
| Select | 5 | Mh-03-Ab-3993 | E0005 | Truck 5 | J K TRANSPORTER | Kartar Singh | 30000 | System | 29-10-2013 18:07:59 | System |

Material Master: This is used to register the various materials being transported by the trucks from the company's plants. Details such as material name, description, etc. are entered into the database.

VETRATM Vehicle Tracking System

Home Dashboard Masters ▶ RFID My Account ▶

LOG OUT User: a

MATERIAL MASTER

Material Code.

Material Name

Material Description

System_ID

| | MATERIAL_ID | MATERIAL_CODE | MATERIAL_NAME | DESCRIPTION | CREATED_BY | CREATED_ON | MODIFIED_BY | MODIFIED_ON |
|--------|-------------|---------------|---------------|--------------|------------|------------|-------------|-------------|
| Select | 1 | A-001 | OPTIMEX | POLYSTER | | | | |
| Select | 2 | A-002 | OPTIMEX-CON | RAW POLYSTER | | | | |



CASE STUDY

User Master: This maintains all information about each user along with user ID, user status, etc.

Role Master: This is used to define various roles or designations for the various users within the system, such as administrator, operator, etc. Each user can only have access to the data that has been assigned to his particular role.

| | ROLE_ID | ROLE_DESC | Deleteflag | CREATED_BY | CREATED_ON | MODIFIED_BY | MODIFIED_ON |
|--------|---------|---------------|------------|------------|---------------------|-------------|---------------------|
| Select | 1 | Admin | | | | | |
| Select | 2 | Millind | | System | 09-10-2013 16:11:18 | System | 09-10-2013 16:11:18 |
| Select | 3 | GAURAV -GUEST | | System | 10-10-2013 14:41:30 | System | 10-10-2013 14:41:30 |
| Select | 4 | Viewer | | System | 01-11-2013 12:18:53 | System | 01-11-2013 12:18:53 |
| Select | 5 | Auditor | | Admin | 04-12-2013 14:33:17 | Admin | 04-12-2013 14:33:17 |

Mapping Modules:

Mapping modules are used to establish the relationship between the data in various masters, such as the materials with their loading bay location. The various mapping modules are:

User Plant Mapping: This is used to map a particular user of the application with a plant registered in the Plant Master. The user will then only be able to details of the plant/plants that have been mapped to him.

| | Mapping_Id | User_Id | Plant_Id | Location_Id | Created_By | Created_On | Modified_By | Modified_On |
|--------|------------|---------|----------|-------------|------------|---------------------|-------------|---------------------|
| Select | 1 | 1 | 1 | 0 | Abc | 10-10-2013 13:51:03 | Abc | 10-10-2013 13:51:03 |
| Select | 2 | 1 | 2 | 0 | Abc | 10-10-2013 13:51:03 | Abc | 10-10-2013 13:51:03 |
| Select | 7 | 10 | 1 | 0 | Abc | 10-10-2013 14:42:53 | Abc | 10-10-2013 14:42:53 |
| Select | 8 | 11 | 1 | 0 | Abc | 29-10-2013 17:08:20 | Abc | 29-10-2013 17:08:20 |
| Select | 9 | 12 | 1 | 0 | Abc | 30-10-2013 15:42:01 | Abc | 30-10-2013 15:42:01 |
| Select | 10 | 13 | 1 | 0 | Abc | 01-11-2013 12:19:15 | Abc | 01-11-2013 12:19:15 |
| Select | 14 | 11 | 2 | 0 | Abc | 01-11-2013 12:19:15 | Abc | 01-11-2013 12:19:15 |



CASE STUDY

Role Menu Mapping: This maps a specific user role to the various menus within the application. A particular user defined role can access only those menus that have been authorized to that role in order to modify or update the data within the application. For e.g. a user defined as administrator can access all menus, whereas a user designated as operator will have restricted access.

ROLE MAPPING

Role Desc: admin
System ID: 2

OK Cancel Clear All

| | Role_Id | ROLE_DESC |
|--------|---------|------------------|
| Select | 1 | Admin |
| Select | 2 | Milind |
| Select | 3 | GAURAV -GUEST |
| Select | 4 | Viewer |
| Select | 6 | LOCAL ADMIN ROLE |

Plant Location Mapping: This maps registered plants to registered locations within the system.

LOCATION REGISTRATION

Plant: K1
Location Name: TOKEN
Sub Location Name: B1
Queue Name: QN1
Description (For User Display): TOKEN
Sub Location Device Ip: 192.168.123.141
System ID: 1

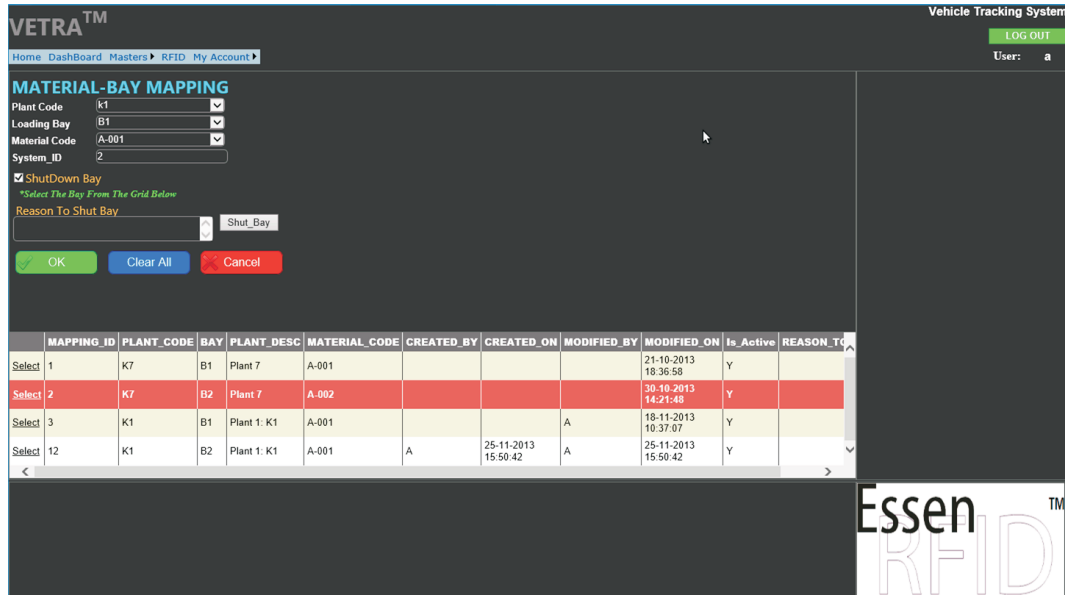
OK Clear Cancel

| | MAP_ID | PLANT_ID | LOCATION_ID | LOC_DESC | DEVICE_IP | SUBLOC_NAME | CREATED_BY | CREATED_ON | MODIFIED_BY | MODIFIED_ON |
|--------|--------|----------|-------------|-------------|-----------------|-------------|------------|---------------------|-------------|---------------------|
| Select | 1 | 1 | 1 | TOKEN | 192.168.123.141 | | Abc | 08-10-2013 14:04:32 | Abc | 08-10-2013 14:04:32 |
| Select | 2 | 1 | 2 | IN | 192.168.123.142 | | Abc | 08-10-2013 14:04:46 | Abc | 08-10-2013 14:04:46 |
| Select | 3 | 1 | 3 | TARE WEIGHT | 192.168.123.143 | | Abc | 08-10-2013 14:04:58 | Abc | 08-10-2013 14:04:58 |
| Select | 4 | 1 | 4 | LOAD_BAY | 192.168.123.144 | B1 | Abc | 08-10-2013 14:05:11 | Abc | 08-10-2013 14:05:11 |
| Select | 5 | 1 | 5 | GROSS_WT | 192.168.123.143 | | A | 05-12-2013 16:40:31 | A | 05-12-2013 16:40:31 |



CASE STUDY

Material Bay Mapping: This is used to map the availability of material at a particular loading bay.



VETRA™ Vehicle Tracking System

Home Dashboard Masters ▶ RFID My Account ▶

LOG OUT User: a

MATERIAL-BAY MAPPING

Plant Code: k1
Loading Bay: B1
Material Code: A-001
System_ID: 2

☒ ShutDown Bay
*Select The Bay From The Grid Below
Reason To Shut Bay: Shut_Bay

OK Clear All Cancel

| | MAPPING_ID | PLANT_CODE | BAY | PLANT_DESC | MATERIAL_CODE | CREATED_BY | CREATED_ON | MODIFIED_BY | MODIFIED_ON | Is_Active | REASON_T |
|--------|------------|------------|-----|-------------|---------------|------------|---------------------|-------------|---------------------|-----------|----------|
| Select | 1 | K7 | B1 | Plant 7 | A-001 | | | | 21-10-2013 18:36:58 | Y | |
| Select | 2 | K7 | B2 | Plant 7 | A-002 | | | | 30-10-2013 14:21:45 | Y | |
| Select | 3 | K1 | B1 | Plant 1: K1 | A-001 | | | A | 18-11-2013 10:37:07 | Y | |
| Select | 12 | K1 | B2 | Plant 1: K1 | A-001 | A | 25-11-2013 15:50:42 | A | 25-11-2013 15:50:42 | Y | |

Queue Priority: This manages the truck queue at the truck waiting area. The administrator can change the priority of a particular truck in the queue as per need, in this module.



VETRA™ Vehicle Tracking System

Home Dashboard Masters ▶ RFID My Account ▶

LOG OUT User: A

QUEUE PRIORITY

Plant Code: k1
Loading Bay: B1
Priority Set: 1
Token: 395
System_ID: 4

OK Clear All Cancel

| | QUEUE_ID | TOKEN | PRIORITY |
|--------|----------|-------|----------|
| Select | 1 | 392 | 1 |
| Select | 4 | 395 | 2 |



CASE STUDY

Trip Cancel: This is used to cancel the trip of a particular truck. This can be done only by an authorized person who has to enter the reason for trip cancellation.

The screenshot shows the 'TRIP CANCEL' form in the VETRA system. It includes fields for Token No. (393), License Plate No. (mh-06-js-1111), Driver Name (Raju Satankar), Reason To Cancel (Documents Not Correct), and System ID (0). There are 'OK', 'Clear', and 'Cancel' buttons. Below the form is a table showing trip details.

| LICENSE_PT_NO | DRIVER_NAME | TOKEN | TOKEN_TIME | IN_TIME | TARE_WT | TARE_WT_TIME | QUEUE_TIME | LOADING_TIME | GROSS_WT | NET_WT | GROSS |
|---------------|--------------|-------|---------------------|---------------------|---------|---------------------|---------------------|--------------|----------|--------|-------|
| Mh-06-Ba-4759 | Kartar Singh | 392 | 09-12-2013 16:06:31 | 09-12-2013 16:39:47 | 20000 | 09-12-2013 17:18:00 | 09-12-2013 17:22:44 | | | | |

Dashboards:

Dashboards are used to display the current status of trucks at various locations within the plant. They are also displayed on large LCD screens at these locations for the benefit of the truckers. They are used to provide directions to the trucks, such as proceed and wait instructions. There are three dashboards used by the system as follows:

Token Dashboard: This shows the list of trucks to whom the token has been successfully issued. It also shows the approximate time for the truck to reach the loading bay, along with instructions that help the truck towards their assigned bay.

The screenshot shows the 'TOKEN DASHBOARD' in the VETRA system. It displays a table of trucks with their license plate numbers, tokens, bays, waiting times, and instructions. A 'VEHICLE DETAILS' sidebar on the right provides additional information for the selected truck.

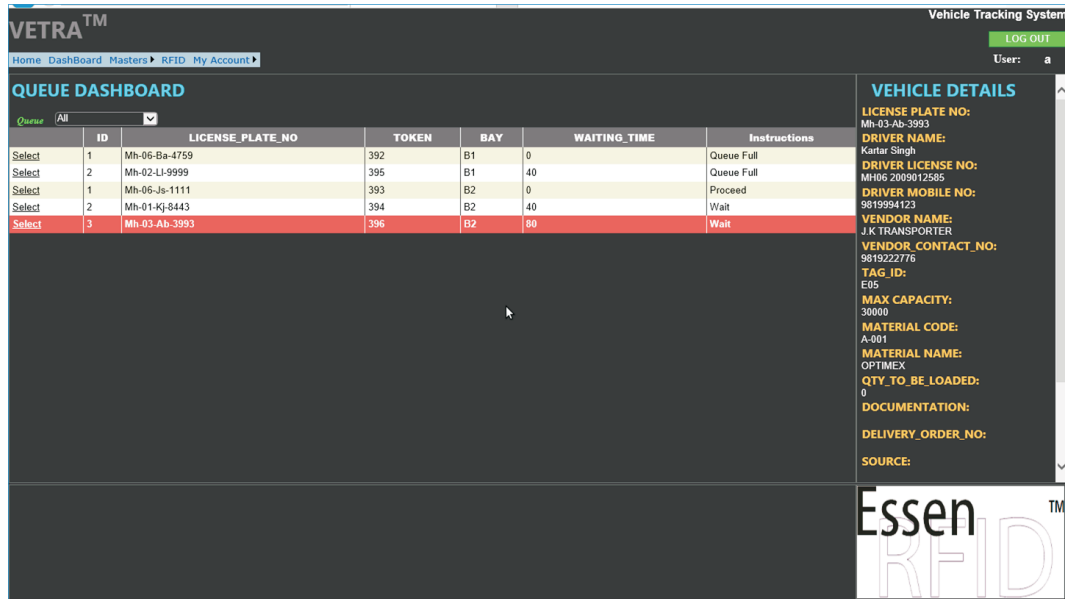
| Select | ID | LICENSE_PLATE_NO | TOKEN | BAY | WAITING_TIME | Instructions |
|--------|----|------------------|-------|-----|--------------|--------------|
| Select | 1 | Mh-06-Ba-4759 | 392 | B1 | 0 | Proceed |
| Select | 2 | Mh-06-Js-1111 | 393 | B2 | 0 | Proceed |
| Select | 3 | Mh-01-Kj-8443 | 394 | B2 | 45 | Wait |
| Select | 4 | Mh-02-Li-9999 | 395 | B1 | 45 | Wait |
| Select | 5 | Mh-03-Ab-3993 | 396 | B2 | 90 | Wait |

VEHICLE DETAILS
LICENSE PLATE NO: Mh-06-Ba-4759
DRIVER NAME: Kartar Singh
DRIVER LICENSE NO: Mh06 2009012585
DRIVER MOBILE NO: 9819994123
VENDOR NAME: TT TRANSPORTER
VENDOR_CONTACT_NO:
TAG_ID: E01
MAX CAPACITY: 30000
MATERIAL CODE: A-001
MATERIAL NAME: OPTIMEX
QTY_TO_BE_LOADED: 0
DOCUMENTATION:
DELIVERY_ORDER_NO:
SOURCE:



CASE STUDY

Queue Dashboard: When a truck completes weighing of tare weight, it proceeds to its assigned loading bay. However, if the loading bay is occupied by another truck, then the truck has to wait for its turn in the queue waiting area. The queue dashboard gives details to each truck regarding the estimated waiting time and also provides them with instructions.

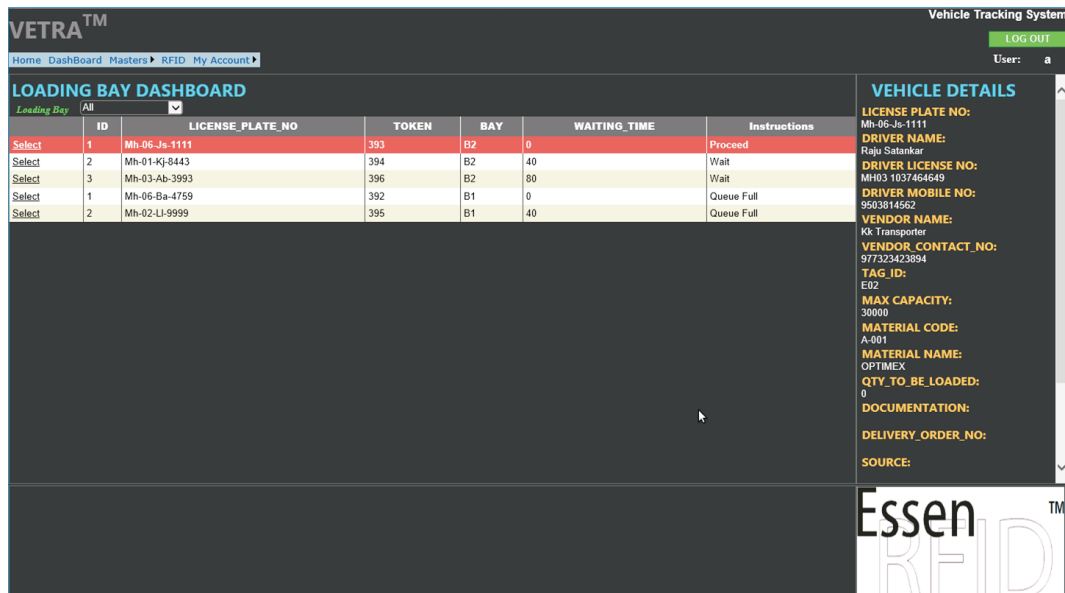


The screenshot shows the VETRA Queue Dashboard. It features a table with columns: ID, LICENSE_PLATE_NO, TOKEN, BAY, WAITING_TIME, and Instructions. The table lists several trucks in a queue. To the right, there is a 'VEHICLE DETAILS' section for the selected truck (Mh-03-Ab-3993), displaying information such as License Plate No, Driver Name, Driver License No, Driver Mobile No, Vendor Name, Vendor Contact No, Tag ID, Max Capacity, Material Code, Material Name, Qty to be Loaded, Documentation, Delivery Order No, and Source.

| ID | LICENSE_PLATE_NO | TOKEN | BAY | WAITING_TIME | Instructions |
|----|------------------|-------|-----|--------------|--------------|
| 1 | Mh-06-Ba-4759 | 392 | B1 | 0 | Queue Full |
| 2 | Mh-02-Li-9999 | 395 | B1 | 40 | Queue Full |
| 1 | Mh-06-Js-1111 | 393 | B2 | 0 | Proceed |
| 2 | Mh-01-Kj-8443 | 394 | B2 | 40 | Wait |
| 3 | Mh-03-Ab-3993 | 396 | B2 | 80 | Wait |

VEHICLE DETAILS
LICENSE PLATE NO: Mh-03-Ab-3993
DRIVER NAME: Kartar Singh
DRIVER LICENSE NO: MH06 2009012585
DRIVER MOBILE NO: 9819584123
VENDOR NAME: J.K TRANSPORTER
VENDOR CONTACT_NO: 9819222776
TAG_ID: E05
MAX CAPACITY: 30000
MATERIAL CODE: A-001
MATERIAL NAME: OPTIMEX
QTY_TO_BE_LOADED: 0
DOCUMENTATION:
DELIVERY_ORDER_NO:
SOURCE:

Loading Bay Dashboard: When a truck reaches the loading bay, it needs to stay there till the loading has been completed. This dashboard displays the approximate loading time for the truck at the bay and the waiting time for the next truck in the queue awaiting loading.



The screenshot shows the VETRA Loading Bay Dashboard. It features a table with columns: ID, LICENSE_PLATE_NO, TOKEN, BAY, WAITING_TIME, and Instructions. The table lists several trucks in a queue. To the right, there is a 'VEHICLE DETAILS' section for the selected truck (Mh-06-Js-1111), displaying information such as License Plate No, Driver Name, Driver License No, Driver Mobile No, Vendor Name, Vendor Contact No, Tag ID, Max Capacity, Material Code, Material Name, Qty to be Loaded, Documentation, Delivery Order No, and Source.

| ID | LICENSE_PLATE_NO | TOKEN | BAY | WAITING_TIME | Instructions |
|----|------------------|-------|-----|--------------|--------------|
| 1 | Mh-06-Js-1111 | 393 | B2 | 0 | Proceed |
| 2 | Mh-01-Kj-8443 | 394 | B2 | 40 | Wait |
| 3 | Mh-03-Ab-3993 | 396 | B2 | 80 | Wait |
| 1 | Mh-06-Ba-4759 | 392 | B1 | 0 | Queue Full |
| 2 | Mh-02-Li-9999 | 395 | B1 | 40 | Queue Full |

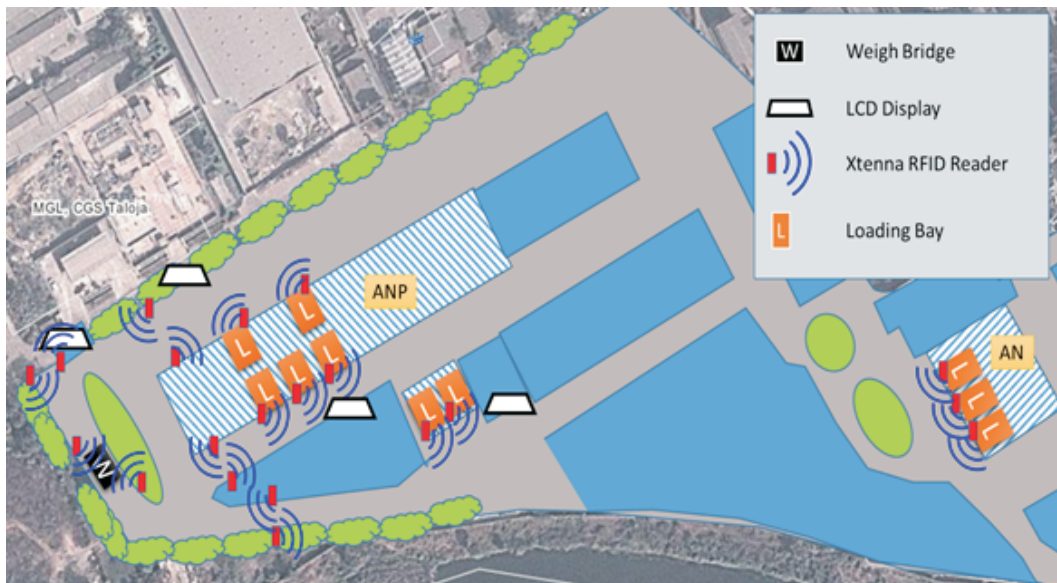
VEHICLE DETAILS
LICENSE PLATE NO: Mh-06-Js-1111
DRIVER NAME: Raju Satankar
DRIVER LICENSE NO: MH03 1037464649
DRIVER MOBILE NO: 9503814562
VENDOR NAME: Kk Transporter
VENDOR CONTACT_NO: 977323423894
TAG_ID: E02
MAX CAPACITY: 30000
MATERIAL CODE: A-001
MATERIAL NAME: OPTIMEX
QTY_TO_BE_LOADED: 0
DOCUMENTATION:
DELIVERY_ORDER_NO:
SOURCE:



CASE STUDY

Working Process:

The Truck Logistics System is implemented for multiple plants of the client within the premises. An example of antenna-reader placement for one of the plants is given below.



Truck Reporting for Entry:

Trucks arriving at the gate are first issued a PARKA™ RFID tag. They then undergo physical verification of documents, such as Lorry Receipt (LR) for carrying the goods, verification of driver's license, etc.

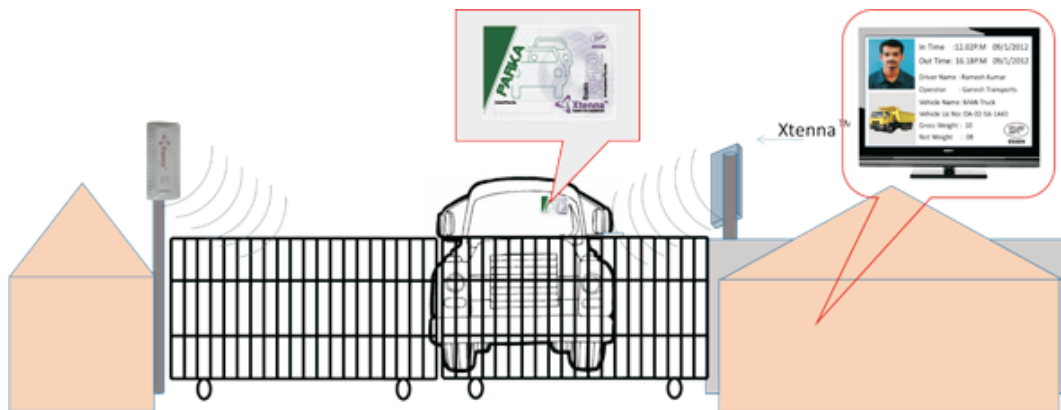
Security personnel then generate a unique token number from the application software for the truck. The truck driver is given the token number that is delivered to the driver through SMS along with expected waiting time and is asked to wait for his turn to enter the gate. He is instructed to check the digital signage (LCD screen) at the gate for further instructions. The screen indicates the approximate waiting time at the gate. This is in sync with the internal processes controlled by the RFID feed-forward system, which makes staff adhere to the standard time defined for each of the processes.



Trucks waiting at the Entry Gate



CASE STUDY



Truck Entry at the IN Gate:

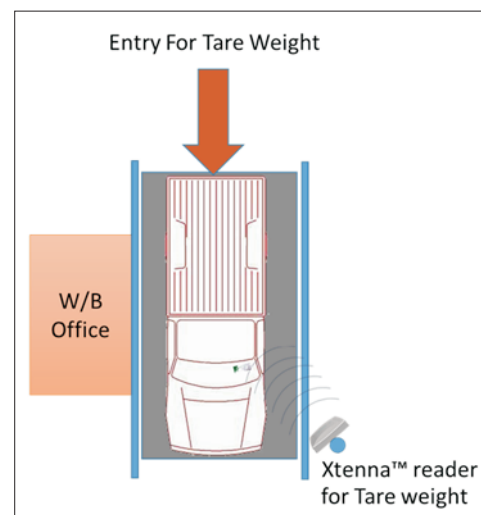
As the truck arrives at the entry gate of the plant, the Xtenna™ antenna-reader mounted detects the RFID tag affixed on the truck and marks its IN time. This simultaneously instructs the weighbridge operator about the next expected truck arrival at the weigh bridge with information about the truck. Once the truck is inside the plant, it proceeds for tare weight measurement at the RFID-enabled weighbridge.

Weighbridge - Tare Weight:

When the truck proceeds to the tare weighbridge, the system updates the status of the truck accordingly. The empty truck arrives at the weighbridge for measuring the tare weight of the vehicle before the goods are loaded. The tare weight and time are updated in the database.

The RFID system creates a transaction for the truck to load the goods. For this a Delivery Order is fetched from SAP WMS using BAPI calls. The truck is then directed by the weighbridge operator deploying an LED display, to the loading bay of the goods. A tolerance limit is allowed for the truck's tare weight as per the company's policy and is assigned by the system.

If a loading bay is free for material loading on to the truck, then the truck is directly sent to the particular loading bay, else the truck needs to wait for its turn in the queuing area.





CASE STUDY

Trucks Waiting for Loading in the Queuing Area:

After completing weighing of tare weight, the truck needs to wait in the queuing area, before proceeding for loading goods when the loading bay becomes available. Here the truck driver is instructed once again through the digital signage (LCD screen) mounted in the queuing area, which gives instructions to each truck driver of estimated time for existing loading to be finished so that he can be prepared to take his truck to the next available loading bay. A queuing time / buffer time limit is configured by the system admin for trucks' queue length and buffer time. Depending on the actual loading duration at the loading bay, the range of the waiting time is configured into the system and a minimum and maximum limit is set for the number of trucks allowed in the queue.

v. 2.1
VETRA™ vehicle traffic status and transit analysis

ESSEN
logout

name@company.com
logged in at 10:30:05 hrs.

configure | tracking | dashboard | diagnostics | PREMIUM rfid | reports | history | my account

LOCATION NO. # 3
LOCATION NAME Loading Queue

Station Utilization
Transit Analysis

Location Status
Alert Status

CURRENT TRAFFIC LOCATION STATUS

LOCATION NO.: 3 LOCATION NAME: Loading Queue
LOCATION CODE: DT10003 TRUCKS AT LOCATION: 17 DELAY ALERTS: 9

2013 SEP 16 | 01:32 PM
send to report

select vehicle << << 14 >> >> search vehicle advanced search

| # | TOKEN NO. | ISSUE TIME | WAITING TIME | STATUS | ALERT | LIC. PLATE NO. | DRIVER NAME | CONTRACTOR |
|----|-----------|------------|--------------|-------------------|-------|----------------|---------------|-------------|
| 1 | 09160139 | 11:40 am | 00:20 min. | waiting | * | MH-01 B4567 | Raju Rajan | Hari Trans |
| 2 | 09160140 | 11:42 am | 00:35 min. | waiting | * | MF-02 C5432 | Santa Kumar | SK Transp |
| 3 | 09160141 | 11:45 am | 01:15 hr. | doc. verification | □ | MH-03 G0987 | Balbir Singh | Singh Bros |
| 4 | 09160142 | 11:47 am | 01:17 hr. | waiting | ** | MK-02 D3251 | Kishor Prasad | Taj Carrier |
| 5 | 09160143 | 11:48 am | 01:18 hr. | waiting | ** | MH-01 D8765 | Chander Kumar | Dhan Sing |
| 6 | 09160144 | 11:50 am | 01:18 hr. | waiting | ** | ML-02 C3254 | Shyam Kumar | Kumar & |
| 7 | 09160145 | 11:53 am | 01:21 hr. | doc. verification | □ | MF-03 G8709 | Tek Singh | Patiala Tra |
| 8 | 09160147 | 11:58 am | 01:26 hr. | waiting | ** | MK-02 D5132 | Shiv Prasad | Taj Carrier |
| 9 | 09160148 | 12:00 pm | 01:30 hr. | waiting ... delay | ! | MH-01 D6587 | Badri Kumar | Kumar & |
| 10 | 09160149 | 12:02 pm | 01:32 hr. | waiting ... delay | ! | MF-02 C2345 | Mohan Rajbir | Dhan Sing |
| 11 | 09160150 | 12:05 pm | 01:35 hr. | waiting ... delay | ! | MH-03 G7890 | Bhim Singh | SK Transp |
| 12 | 09160151 | 12:06 pm | 01:36 hr. | waiting ... delay | ! | MH-02 D1523 | Rahim Khan | Taj Carrier |
| 13 | 09160153 | 12:10 pm | 01:40 hr. | waiting ... delay | ! | MH-01 D7865 | Vijay Kumar | Hari Trans |
| 14 | 09160156 | 12:20 pm | 01:50 hr. | waiting ... delay | ! | MF-02 C4523 | Surjit Singh | Singh Bros |
| 15 | 09160157 | 12:22 pm | 01:52 hr. | waiting ... delay | ! | MH-03 G9078 | Devraj Prasad | Hari Trans |
| 16 | 09160158 | 12:25 pm | 01:55 hr. | waiting ... delay | ! | MK-02 D1532 | Karim Khan | Taj Carrier |
| 17 | 09160160 | 12:30 pm | 02:00 hr. | waiting ... delay | !! | MH-01 D5687 | Manjit Singh | Singh Bros |

vehicle details

LICENCE PLATE NO. MF-02 C4523
DRIVER Surjit Singh
DRIVING LICENCE NO. MH-1220050000377
MOBILE NO. 9087654321
CONTRACTOR/VENDOR Singh Bros.
CONTACT NO. 022-24823278

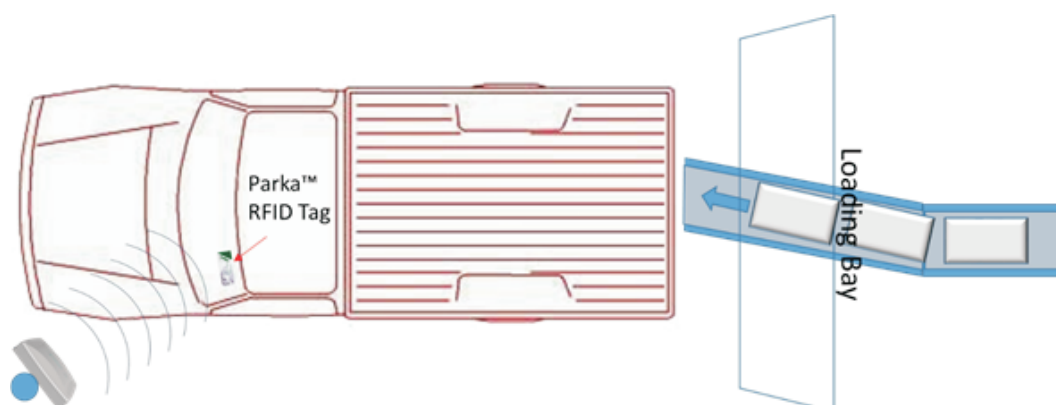
TRUCK TAG ID 010V752461881255 ✓

CURRENT LOADING
MATERIAL CODE A03
QUANTITY TO BE LOADED 9000 kg
DOCUMENTATION LR: V2282
TOKEN NO. 09160156
TOKEN ISSUE TIME 12:20 pm
CURRENT LOCATION # 14
EXPECTED COMPLETION TIME 3:50 pm

VEHICLE DELAY ALERTS

at entry gate 4 ALERT
in loading queue 9 ALERT
in weighing queue 7 ALERT

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CASE STUDY

At the Loading Bay:

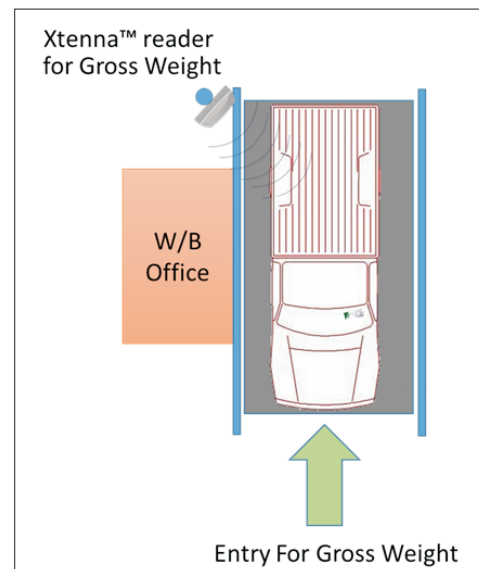
When the truck arrives at the loading bay, the Xtenna™ mounted there detects the truck and the system adds the information against the transaction created for that truck and updates the status as under loading.

Based on the capacity of the truck, its average loading time has been defined by the loader, depending on whether the loading bay has automatic or manual loading. A minimum and maximum time required at each loading bay is already defined in the system, depending on the output capacity of the loader. Therefore, the minimum and maximum time required to load the particular truck is calculated by the system.

After loading is completed, the truck is directed for weighing of gross weight on the weighbridge, using digital signage (LCD screen). In case of weighbridge not being vacant, the truck is instructed to wait with approximate waiting time indicated to it.

Weighbridge - Gross Weight:

After goods have been loaded, the truck arrives at the weighbridge for gross weighing. Its tag is read by Xtenna™ and the truck is identified. The weighing is done and examined against its tolerable limit allowed in terms of underloading and overloading. If the truck has not been adequately loaded, it is sent for reloading, and if overloaded, it is sent to unload the excess load. The net weight of goods being transported in that transaction is thus validated by the system.



Truck Exit at the OUT Gate:

Once the gross weight is captured and net weight of the transaction validated, the truck moves to the exit gate. At the exit gate, exit documentation for the transaction is completed and the truck driver is handed over the invoice, delivery challan, excise gate pass and road permits. The truck has to reach the exit gate within the stipulated time to enable efficient dispatch operations. The Xtenna™ mounted at the exit gate detects the truck's PARKA™ tag and logs the exit time, after which the tag is returned back by the exiting truck. The returned tag is disassociated from the assigned truck in the database and sent to the entry gate for reuse with another incoming truck.



CASE STUDY

The administrator can view a summary of all locations on the web application.

v. 2.1

VETRA™ vehicle traffic status and transit analysis

name@company.com
logged in at 10:30:05 hrs.

configure | tracking | dashboard | diagnostics | rfid | reports | history | my account

Station Utilization | Transit Analysis

Location Status | Alert Status

2013 SEP 16 | 01:32 PM

send to report | VIEW DETAILS

CURRENT TRAFFIC LOCATION STATUS

LOCATIONS: 7 | CURRENT TRUCK ID READS: 68

| # | LOCATION CODE | LOCATION DESCRIPTION | TRUCKS | |
|---|---------------|---|--------|------|
| 1 | DTL0001 | Outside 'IN' Gate # Entry Token Issued | 11 | VIEW |
| 2 | DTL0002 | At Weighbridge # For Tare Weight | 6 | VIEW |
| 3 | DTL0003 | In Loading Queue # Before Loading | 17 | VIEW |
| 4 | DTL0004 | At Loading Station # Loading in Progress | 6 | VIEW |
| 5 | DTL0005 | In Weighing Queue # After Loading | 14 | VIEW |
| 6 | DTL0006 | At Weighbridge # For Gross Weight | 6 | VIEW |
| 7 | DTL0007 | At 'OUT' Gate # Awaiting Exit | 8 | VIEW |

Data availability only for tagged vehicles

select vehicle | search vehicle | advanced search

| # | TOKEN NO. | ISSUE TIME | CURRENT LOCATION | WAITING TIME | STATUS | ALERT | LIC. PLATE NO. | DRIVER NAME |
|---|-----------|------------|------------------|--------------|-------------------|-------|----------------|-------------|
| 1 | 09160137 | 11:35 am | loading bay-5 | -- | loading ... delay | ! | MH-03 D9812 | Abdul Aziz |
| 2 | 09160138 | 11:37 am | loading bay-6 | -- | loading | ✓ | MK-01 B8765 | Hoshiyar S |
| 3 | 09160139 | 11:40 am | loading queue | 00:20 min. | waiting | * | MH-01 B4567 | Raju Rajan |
| 4 | 09160140 | 11:42 am | loading queue | 00:35 min. | waiting | * | MF-02 C5432 | Santa Kum |
| 5 | 09160141 | 11:45 am | loading queue | 01:15 hr. | doc. verification | ! | MH-03 G0987 | Balbir Sing |

vehicle details

LICENCE PLATE NO. MH-01 B4567

DRIVER Raju Rajan

DRIVING LICENCE NO. MH-1220050000188

MOBILE NO. 9012345678

CONTRACTOR/VENDOR Hari Transporters

CONTACT NO. 022-26528254

TRUCK TAG ID 010V752461883923 ✓

CURRENT LOADING

MATERIAL CODE A03

QUANTITY TO BE LOADED 8500 kg

DOCUMENTATION LR: J-5634

TOKEN NO. 09160139

TOKEN ISSUE TIME 11:40 am

CURRENT LOCATION # 3

EXPECTED COMPLETION TIME 3:15 pm

VEHICLE DELAY ALERTS

at entry gate 4 ALERT

in loading queue 9 ALERT

in weighing queue 7 ALERT

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BENEFITS:

- Regulated inflow of trucks into the plant premises.
- Automatically tracks the progress of each truck in its movement through the plant premises and monitors adherence to time cycle from entry to exit.
- Tracks the time spent by trucks at each touch point within the plant.
- Identification of delay areas and bottlenecks in the dispatch process.
- Optimum utilization of all loading bays within the plant for goods dispatch.
- Efficient weighbridge operations and automated weighment calculation.
- Efficient queuing of trucks and minimizing of trucks in each queue.
- Indication of estimated waiting time at each section or touch point to the truck drivers as well as dispatch staff on display screens.
- SMS alerts to truck drivers to proceed for weighing and loading.
- Identification of time wasters amongst truck drivers.
- Efficiency and accuracy lead to improved dispatch management.
- In-built checking for underloading and overloading of trucks.
- Efficient document generation and processing for goods dispatch.
- Improved security within the plant premises.
- Automated real-time status report generation for trucks, trips, destinations, entry/exit times and quantity dispatched.



CASE STUDY

LINKS:

Hardware:



Tags:



Software:



Reference Example:

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