Yard Management System

By

Automation Division

Tata Steel Ltd.

At

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YMS Function
(Sachin Gupta)
  Why ?
  Functions
  Benefits
  Highlights

YMS Case Study
(Joshi Jacob)
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  Transport System
  at CRM
What is the General Scenario of Any Yard Before Yard Management System?
A Trailer Arrives With Some Material

Manual Reporting of Material Arrivals or At Berth

PLZ...PLZ...PLZ do this....

Manual Job Orders To The Transporter & Operator
BEFORE YMS: Yard Scenario

Crane Operation By Hand/Manual Signaling
Continuing instructions for the material movement

Maintenance of ‘spread sheets’, ‘clip board’ or ‘tables’ to update the stock information
End Results

- Poor housekeeping
- Labor intensive jobs
- Inconsistency of information
- Poor planning at all stages
- Poor compliances to the order fulfillment
Problems Encountered

• Everyone keeps different information.
• Information never remains current.
• Researching trailer status takes hours.
• Locating materials is tedious.
• Visualizing yard is even more complex.
• Staff spent time on trailer shuffling on yard.
• Phone, fax times takes up to hours a day.
Effects on Plant Operation?

- High labor cost due to manpower involvement at all stages.
- High operating & maintenance cost due to lack of process optimization and damages resulting from operator errors.
- Poor product tracking due to verbal data transfer, loss of time/material.

Generic Yard Management System (*Yard Scope*) Addresses Each of These Problems.
STOCK IN MANAGEMENT
- Material receipt management in yards.
- Material feeding to various process lines.

YARD MANAGEMENT
- Optimized material storage in yards (location management)
- Material movement across different yards & process lines.
- Material re-arrangement as pre-dispatch arrangement.

STOCK OUT MANAGEMENT
- Evacuation of materials from different process lines.
- Dispatch planning.
YMS: Functional Modules

EQUIPMENTS MANAGEMENT
- Crane management.
- Coil conveyor management.
- Transfer car management.

PROCESS LINE TRACKING
- Material tracking and history in its complete lifecycle across process lines.
- System interfaces with Line L#1, Line L#2, SAP & MES for capturing relevant information and process interlocking.

DESPATCH MANAGEMENT
- Execution of dispatch plan in accordance for best fit.
- Wagon/trailer tracking (*Thru Vehicle Tracking System*).
- Reporting and documentation.
YMS: Highlights

- Single window Logistics solution
  - Inbound
  - In Process
  - Outbound
- Inter/Intra yard material flow scheduling
  - Yard optimization
  - Contingency handling
- Equipment Control, Tracking & Interlocking
  - Crane control
  - Transfer car tracking
  - Coil conveyor tracking
YMS: Highlights

• Smart information management
  – Transparent information flow and consistency
  – Seamless connectivity with lower (process) and higher (SAP/MES) level systems
  – User defined reporting and visualization

• Scalable and Expandable
  – Bay extensions/additions
  – Yard re-configurations
<table>
<thead>
<tr>
<th>Operating system</th>
<th>RF Network</th>
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</thead>
<tbody>
<tr>
<td>• Server – Win 2008 Server.</td>
<td>• On Ground – 2.4GHz DSSS</td>
</tr>
<tr>
<td>• Crane – Win XP Embedded.</td>
<td>• On Crane – 2.4GHz DSSS</td>
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<tr>
<th>Application software</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Server – Sun Java</td>
<td>• PLC/Drives (Cranes)</td>
</tr>
<tr>
<td>• Crane – C# 2.0</td>
<td>• Laser Distance Meters</td>
</tr>
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<table>
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<tr>
<th>Data Base</th>
<th>Computer Hardware</th>
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<tr>
<td>• Server – Oracle 10G</td>
<td>• Server – HP Proliant</td>
</tr>
<tr>
<td>• Crane – None</td>
<td>• Clients – Panel PC.</td>
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CASE STUDY

CTTS / SYMS

At

Tata Steel Ltd.
Details of CRM
Layout of CRM
Operations in the yard
CTTS system configuration
Interfaces of CTTS
Various process times of coil handling
Benefits
DETAILS OF CRM PLANT

• No of process lines – 11
  (PLTCM -1, ECL -1, BAF-1, SPM-1,CGL -2, RCL -3,
   PL -1, CPL -1)
• No of cranes under CTTS control- 18
• No of coil cars & conveyors – 10
• No of storage bays – 7
• Storage space – 3800 coils
• Average coil movements per day – 1000 coils
• Dispatch – Rated - 3500 T/day,
LAYOUT OF CRM AT TATA STEEL
COMPLEXITY IN THE DIFFERENT YARD OPERATIONS

FUNCTION

EXAMPLE OF DIFFERENT OPERATION

Stock in operation
- Receive of HR coil

Stock Out Operation
- Road Dispatch
- Rail Dispatch

Internal Mutation

Feeding and evacuation from processing line
- Processing line Feeding
VARIOUS PROCESS TIME

- Time of Coil on Saddle: 62%
- Waiting for despatch: 18%
- Trailer Waiting Time: 15%
- Stocking Time: 1%
- Loading Time: 4%
- Rolling Time: 0%
AREAS WHERE WE CAN IMPROVE BY CTTS

- **Wrong Trailer Loading**: 17%
- **Manual Data and Doc. Handling**: 20%
- **Delay in Stocking time, Information to Crane**: 5%
- **Delay in Trailer arrival Information**: 27%
- **Coil Tracing time for Loading**: 31%
- **Wireless Data Connectivity to Crane Enables Instant Messaging.**
- **Location Based Tracking System with Autopositioning**

**Computerized Yard Management System** provides effective document handling.

**Trailor Tracking System** enables identification of right trailer for right coil in right time.
BENEFITS OF YARD MANAGEMENT AT CRM

• CRM dispatch increased from 1.2 MT to 1.5 MT (increase of 25%, CTTS had a part to play).
  ➢ Maximization of yard space utilization.

• Reduction of demurrage charges
  ➢ due to wagon turn around time
  (documentation – Wagon builder software)
  ➢ due to reduction in trucks/trailer waiting time
  & visibility (VTS)

• Reduction in inventory held- due to visibility of material,
  reduction in various process cycle times.
SLAB CASTER YARD LAYOUT
**BENEFITS OF SYMS AT TATA STEEL**

- Optimum utilisation of space – handling of 2 MT from 1MT in the same yard (investments in equipment handling also)

- Increase in use of direct hot slabs in rolling from nil to 54% (investments in equipments like CTRT also)

- Scheduling effectiveness from 60% to 67% (compliance to schedule generated from FP planning system)

- Reduction of lost slabs – due to traceability – down from 20% to zero. (in conjunction with FP planning system)
• Achieving 100% visibility of vehicles/wagons (VTS) and inventory, in the yard.

• Leveraging a single point of yard command and control

• Achieving dispatch compliance to customers

• Maximizing yard space utilisation (2 high coils, traceability etc)

• Facilitating transport appointment scheduling (VTS)