Analytics for effective warehouse operations using Qlik Sense

Khuzema Tikiwala & Elizabeth Cornelison

April 27, 2023
Agenda

- Introduction
- Background
- Operations Overview & Project Process
- Use Case – Operation Qlik Apps
  - Picks – COPS Operations
  - On Time Shipping
  - Lines Tagged Putaways & Dunnage Receiving
  - Value Added Services: Packing Work Order Status
- Q & A
Khuzema Tikiwala

Graduated from Indore University as Mechanical Engineer in 1991

Diploma in Marketing Management in 1994

In Finance in 1996

Diploma in Advance Computing

Passionate about music/singing! Hosted a radio program on AM 1460 for 2 years

Qlik Luminary for 2020, 2021, 2022 & 2023

Luminary 2023

Favorite Places
Mountain/Beach

MBA

Qlik Luminary for
2020, 2021,
2022 & 2023

Qlik
Luminary
2023

Luminary 2023

Favorite Places
Mountain/Beach
Elizabath Cornelison

- **Profession:**
  - Sr. Business Analyst at Cummins-Meritor in the Aftermarket Division
    - NA Aftermarket Warehouse Operations Qlik Project

- **Education:**
  - M.S. in Economics, University of Utah, Salt Lake City, UT
  - B.A. in Economics & Management, Wells College, Aurora, NY

- **Fast Facts:**
  - I’m a working mom.
  - I am currently training for the Flying Pig Marathon in Cincinnati on May 7th.
  - My hobbies include reading, going to festivals, running, weight training, hiking, and taking my kids on adventures.
Introduction

About Cummins-Meritor

In 2022, Cummins acquired Meritor, Inc. Now a business unit within Cummins’ Components segment, Cummins-Meritor is a global supplier of axles, brakes, suspensions, drivelines and aftermarket parts for the commercial vehicle and industrial markets.
Introduction

Cummins-Meritor Product Portfolio

Truck
- Axles
- Drivelines, universal joints and yokes
- Cam, air and hydraulic brakes
- Automatic slack adjusters

Trailer
- Axles
- Air ride suspensions
- Meritor Tire Inflation System™ (MTIS)
- Brakes

Defense
- Full portfolio of axle and brake technology
- All-wheel drive systems
- Independent suspension axle systems (ISAS)
- Military-grade drive axles
- Transfer cases

Off-Highway
- Heavy-duty front and rear axles
- All-wheel drive systems
- Transfer cases
- RT crane axles

Specialty
- Front and rear axles
- All-wheel drive systems
- Transfer cases
- Gearboxes
- PTOs

Aftermarket
- Original equipment service parts
- All-makes programs
- Remanufactured parts
Background

- Centralized self-service *Data & Analytics* using Qlik Sense.
  - More than 650 users
  - 120 dashboards created by 40 plus developers

- Cummins-Meritor Aftermarket Operations Warehouse – Qlik Analytics Project
  - Prior to Qlik:
    - Data was difficult to access
    - Used legacy reporting software
    - Extracting data & metrics took hours
    - Some metrics were not possible to calculate (dock to stock)
  - With Qlik:
    - Easily accessible
    - Updated bi-hourly
    - Increased efficiency in reporting
    - Increased efficiency for labor management
    - Insight into where to prioritize efficiency projects
Receiving (REC)

Functional Areas
- Receiving Product
- Returns (RGNs)
- Initial Quality Inspections
- Space Utilization

Work Areas
- Operate two docks (Front & Back)
  - Total of 12 doors
- Quality Inspection Area
- Return Inspection Area

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<tr>
<th>Employees</th>
<th>Shifts</th>
<th>Daily Lines Processed</th>
<th>Annual Lines Processed</th>
<th>Annual Shipments Received</th>
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<td>638</td>
<td>157K</td>
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Value Added Services (VAS)

Work Centers
- Automated Packaging Lines
- Conveyors
- Bagging
- Hand Pack
- Heavy Pack
- Specialty (Tubes & Carriers)

Products
- Bearings, Brake Pads, Brake Kits, Camshafts, ASAs, Center Bearings, U-Joints, Sub-Kits
- VAS packs/labels 82% of sold parts

<table>
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<tr>
<th>Work Centers</th>
<th>Employees</th>
<th>Shifts</th>
<th>Daily Cartons Packed</th>
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Customer Operations (COPS)

Pick Areas
- Pick on Foot (POF)
- Reach Picks
- OP Picks

Products
- Axles, Air Systems, Brakes, Ride Control, Suspensions, Trailer Axles, Clutches, Drivelines, Electronic Products, Steering Gears

<table>
<thead>
<tr>
<th>Employees</th>
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<th>Daily Lines Picked</th>
<th>Annual Lines Picked</th>
<th>Annual Shipments</th>
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</thead>
<tbody>
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<td>2</td>
<td>4833</td>
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<td>271k</td>
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Meritor NA Aftermarket Operations Overview
Project Process

- Project kickoff
  - identifying contacts/internal customers
  - research & interviewing to understand current process, business needs, metrics, and identify/prioritize projects

- Work with internal resources including IT, Data & analytics, Kronos

- Testing & User Acceptance
  - Validating data
  - Testing impact on production servers of hourly & bi-hourly data loads

- Build Qlik Apps using data load editor

- Training for managers, operational leads, & team leads

- Agile Sprints
  - Iterative updates of Qlik apps for continuous improvement using User Stories (as a..., I want..., so that...)

- Future Projects
Picks – COPS Operations NA Aftermarket

- Provides picking transactional data for the Customer Operations (COPS) department
  - Operation leads use the picks app for metrics and labor management including:
    - # of picks transaction, pick types, location, equipment type
    - Overtime needs, how shifts are doing current, weekly, monthly, manage employees, lead employee reviews
- Qlik significantly reduced time to pull data & metrics for the Operation Leads & managers
- Quality manager uses the app to determine # of picks per user compared to the errors report
- 15 unique users with over 350 sessions in the past month and steady growth in usage
On Time Shipping

- Able to check customer order lines and prioritize work based on hourly data where as prior manual update of report took time/effort
- Increased quality of shipping customer orders on time / reduced past due shipments
- Prioritization of work for shipping customer orders
- Easy tool to open & see visibly what needs to get out the door each day
- Positively impacts customer order misses & fill rate
- Based on shift, use case is different:
  - 1st shift: prioritize picking and prepping shipments
  - 2nd shift: prioritize orders to ship
- 12 unique users & 157 sessions after being published in the past month
On Time Shipping – Metrics Overview
On Time Shipping – Past Due Orders
Lines Tagged Putaways & Dunnage Receiving NA AFM

- KPIs for Receiving department including # of picks, putaways, & dunnage transactions completed
- Monitor employee transactions to understand labor productivity as well as provide employee feedback during reviews
- Operation Leads & team leads able to quickly provide planners information when they need specific part# expedited
- Determine whether need to shift labor from tagging to putaways or vice versa
- Saves 20+ mins daily for Operation Leads and leads to pull transactional data & prep team meeting slides
- 9 unique users with 228 sessions over the past month
Lines Tagged Putaways & Dunnage Receiving NA AFM

Yesterday's Overview

Transactions 1,497
Putaways Transactions 307
# Lines Tagged 32
Dunnage Transactions 20

Yesterday's Transactions by User

USR_ID Values

Transactions # Lines Tagged Putaways Transactions Dunnage Transactions

Reload Date (Data Ag) 4/6/2023 10:40:03 PM
Select Date 2023-04-06
Lines Tagged Putaways & Dunnage Receiving NA AFM
VAS: Aftermarket NA Packing Work Order Status

- Prioritization of open work orders within VAS department
  - Breaks down by workstation, carton type, carton description, age of work orders, part#
- Reduces the number of work orders aged over 5 days
- Updated hourly
- Used by manager, Operation Leads, and team leads
VAS: Aftermarket NA Packing Work Order Status
All operations dashboards

- COPS Operations NA Aftermarket
  - Loading
  - On Time Shipping
  - Order Lines Shipped
  - Picks
  - Shuttling
  - Weigh & Label

- Receiving
  - Lines Tagged, Putaways, & Dunnage
  - Dock to Stock

- VAS
  - Packing Work Order Status
  - Production Inbound & Outbound
Q&A
Appendix / Backup Slides
Order Lines Shipped

- Breaks down what COPs shipped out the previous day which correlates with on time shipping & fill rate metrics
- Used to look at past due & track down and understand shipping misses trends
  - KPIs broken down by customer, order type, carrier type highlights areas that COPs struggles with the most
  - allows Operation Leads & managers to devise corrective actions to fix future customer orders & decreases misses in the future
- 9 unique users (2 Operation Leads who use the app daily) with 57 sessions averaging 1:26 mins session length