

A 3D architectural rendering of a large industrial cargo terminal. The scene shows several large cargo ships docked at a pier. In the background, there are numerous large cylindrical silos. The water is dark, and the sky is a clear, light blue. The overall scene is a detailed digital model of a port facility.

T | B | A[®]

Simplifying your operation

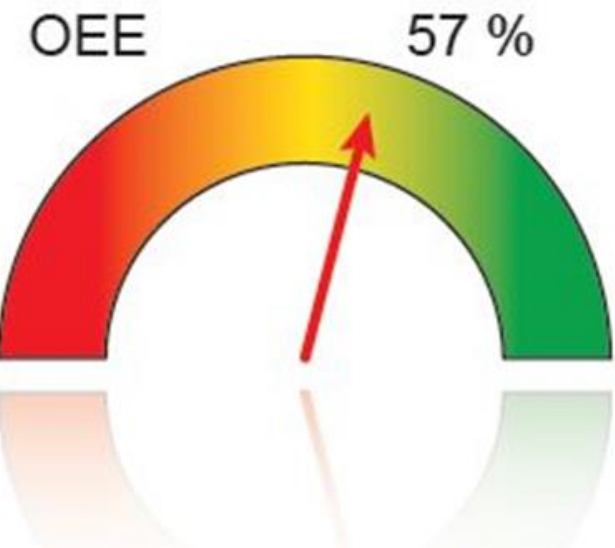
Cargo Terminal Overall Equipment Effectiveness

March 2023

TBA 2023

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- ✓ | About OEE
- ✓ | Capturing and Presenting Data
- ✓ | Root Cause Analysis
- ✓ | What Data Should be Used
- ✓ | Conclusions



Using OEE

A performance based KPI designed to measure Availability, Speed Loss and Output Quality of a process

- ✓ | Comparable across different sectors, operations and processes
- ✓ | Fully focused on losses
- ✓ | One figure connects all parameters
- ✓ | Understandable for operators
- ✓ | Operators can influence the outcome
- ✓ | Checks and balances are built in (No fudging...)

Factor

Availability

Performance

Quality
(optional for Terminals)

OEE

Calculation

Actual Production time / Planned production time

Current run rate / Ideal run rate

Product loss, safety & damage incidents

Availability X Performance X Quality

$$\frac{\text{Actual Availability}}{\text{Planned Availability}} \times \frac{\text{Actual Tonnes Per Hour}}{\text{Design Tonnes Per Hour}} \times 100 = \text{OEE}$$

✓ | Example:

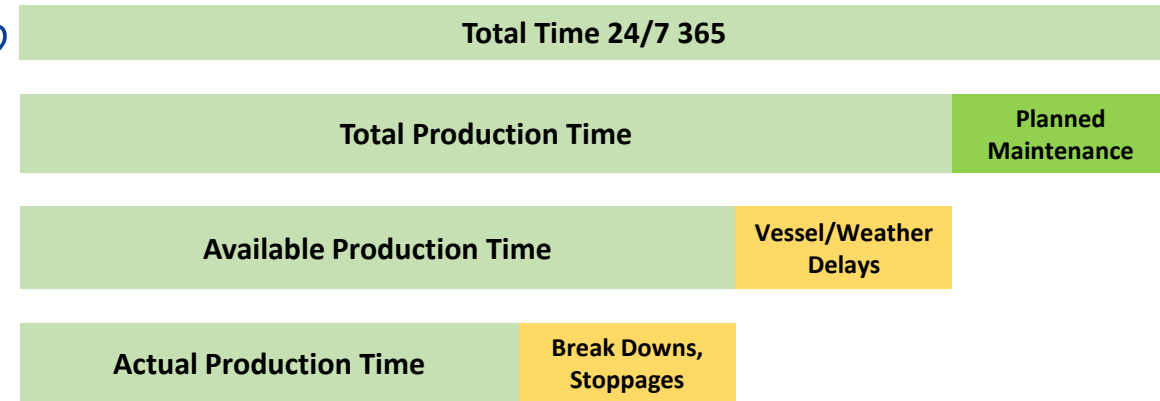
$$\frac{90 \text{ Hours}}{96 \text{ Hours}} \times \frac{960 \text{ TPH}}{1500 \text{ TPH}} \times 100 = 60\% \text{ OEE}$$

✓ | Terminal must decide as to 'what is available time'?

- 24 x 7?, Vessel on berth, Vessel working?

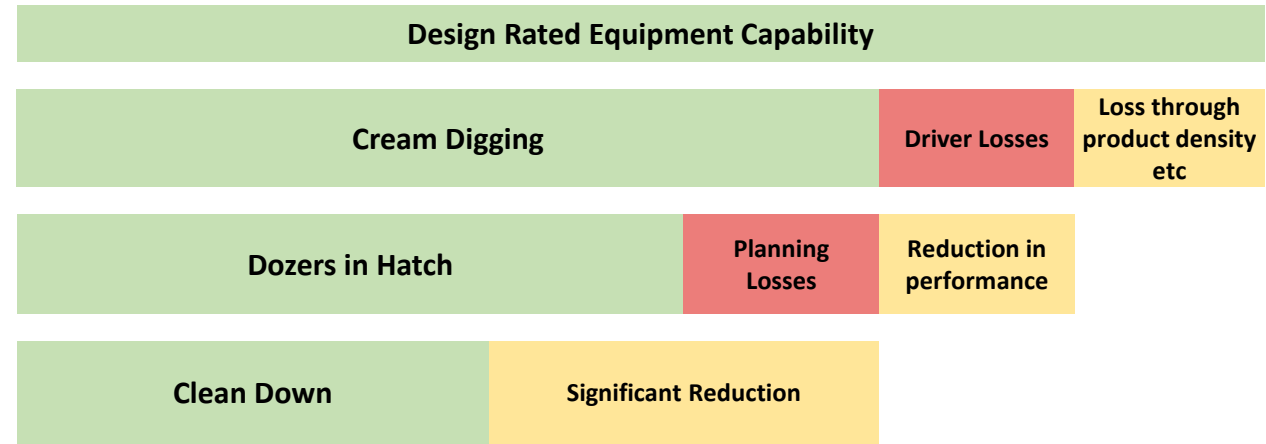
✓ | Considerations:

- Planned maintenance could be argued either way
 - Pro: Unreliable equipment can be identified
 - Con: The scheduled outage is a known factor and can skew actual OEE
- TBA Suggest to Include ALL direct & indirect equipment delays (From NOR)
- Indirect
 - Vessel & weather delays, hatch change, de-ballasting etc
- Direct
 - Equipment breakdowns, unplanned maintenance

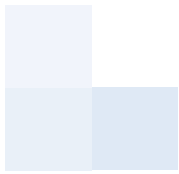


- ✓ | Equipment will be design rated with specified tons per hour per commodity for optimum run rate
 - Terminal constraints could reduce the optimum rate but TBA recommend always using the design rate in order to aspire for optimum performance

- ✓ | TBA recommends measuring Vessel Discharge overall rather than individual pieces of equipment



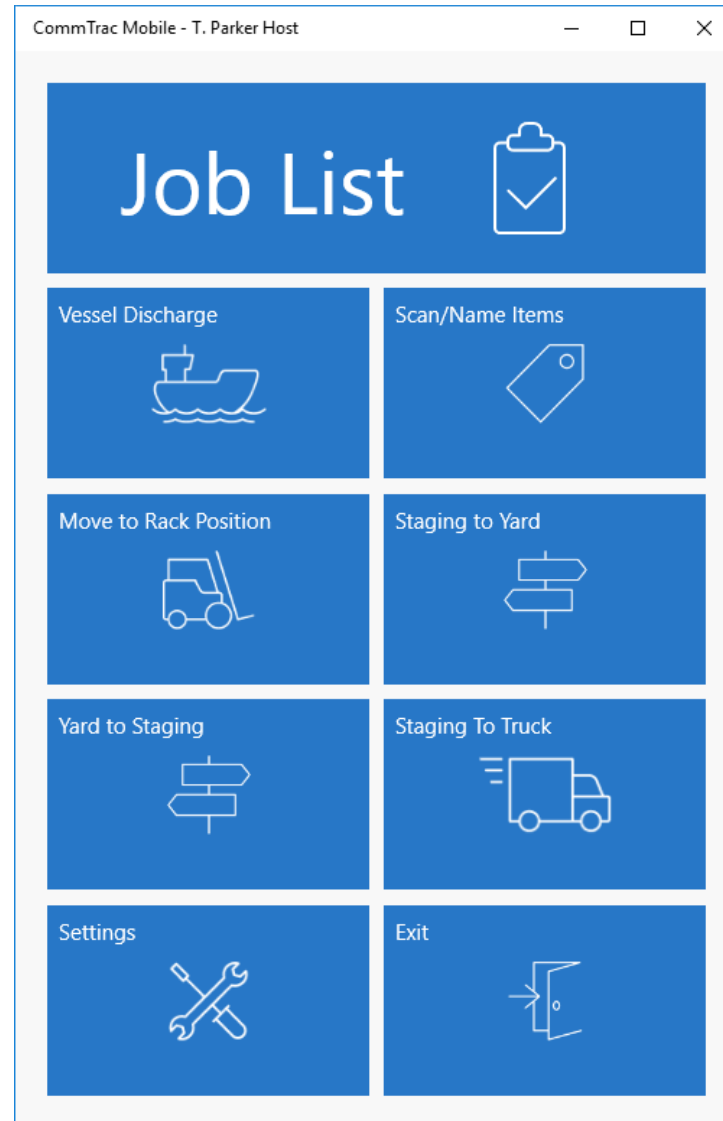
Capturing and Presenting Data



- ✓ | Vessel unloading status in real time driven by data from the automation layer and from users entering data

The screenshot displays the CommTrac Vessel Status Chart interface. At the top, a navigation menu includes Booking, Planning, Operations, Commercial, Reporting, and Admin. A red banner at the top right indicates 'TBA_TDO_DISCOVERY'. The main area shows a vessel's hold unloading status with a bar chart and a table below it. The vessel is 'Arklow Forest - 22-000012' with an arrival time of '05 Feb 2022 09:29'. The hold unloading status is shown as a bar chart with four holds: Hold 04 (10000.000/10000.000Tonnes), Hold 03 (9670.000/10000.000Tonnes), Hold 02 (10000.000/10000.000Tonnes), and Hold 01 (6115.000/10000.000Tonnes). Below the chart is a table with columns: Consignment, Lot Number, Port of Loading, Port of Discharge, Consignor, Total MT, FDS Quantity, Allocated MT, and Unallocated MT. The table shows one consignment: VITERRA UK LTD with a total MT of 40,000.000. To the right, a 'Vessel Status Chart' section shows 'Incoming' status with details: Vessel Name: Arklow Forest, Visc Ref: 22-000012, Location: OBI - OC Terminal, Agent: [Agent Name], Stoppages: 1:29, Estimated Completion: 23-Feb-22 16:36, Completed Ratio: 10.54%, Actual Arrival: 05-Feb-22 09:29, Planned Departure: 09-Feb-22 09:29. Below this is a 3D model of the vessel with colored blocks representing the holds. At the bottom right, a table shows the hold unloading status with columns: Hold, BL, Parent Product, Product, Storage Category, Opening, Completed, and Remaining.

Hold	BL	Parent Product	Product	Storage Category	Opening	Completed	Remaining
Hold 04	VI-Sayahulls-001	SOYA	SOYA HULLS	Weight	10,000,000	0,000	10,000,000
Hold 03	VI-Sayahulls-001	SOYA	SOYA HULLS	Weight	10,000,000	330,000	9,670,000
Hold 02	VI-Sayahulls-001	SOYA	SOYA HULLS	Weight	10,000,000	0,000	10,000,000
Hold 01	VI-Sayahulls-001	SOYA	SOYA HULLS	Weight	10,000,000	3,885,000	6,115,000



Note: This filter did not generate any results

Events

+ Add
◆ Discharge To Yard
◆ Discharge To Rail
◆ Events Diary
◆ Statement of Facts
◆ Work Log
Y Filter
Note: this grid is filtered
Last Refreshed @ : 2022-02-07 08:02
🔍
📄
🖨
🔄

	Hold	Start	End	Duration	Rate	Event Type	Event Name	Description	Metric Tonnes	Short Tonnes	Item
⌵	Hold 02	07 Feb 2022 09:10	07 Feb 2022 12:30	3.20	1.00	Operation	Vessel Discharging				
⌵	Hold 02	07 Feb 2022 08:30	07 Feb 2022 09:05	0.35	1.00	Waiting for Hatches to open	Hatch Covers				
⌵	Hold 01	07 Feb 2022 08:20	07 Feb 2022 12:30	4.10	1.00	Operation	Vessel Discharging				
⌵	Hold 01	07 Feb 2022 07:44	07 Feb 2022 08:15	0.31	1.00	Waiting for Hatches to open	Hatch Covers				
⌵		07 Feb 2022 07:30	07 Feb 2022 07:30	0.00	1.00	Operation Start	Vessel Operations Start				
⌵		06 Feb 2022 18:20	06 Feb 2022 18:20	0.00	1.00	Operation End	Vessel Operations Stopped				
⌵	Hold 02	06 Feb 2022 16:17	06 Feb 2022 18:17	2.00	1.00	Operation	Vessel Discharging				
⌵	Hold 02	06 Feb 2022 15:30	06 Feb 2022 16:10	0.40	1.00	Waiting for Hatches to open	Hatch Covers				
⌵	Hold 01	06 Feb 2022 15:16	06 Feb 2022 18:17	3.01	1.00	Operation	Vessel Discharging				
⌵	Hold 01	06 Feb 2022 14:49	06 Feb 2022 15:15	0.26	1.00	Waiting for Hatches to open	Hatch Covers				

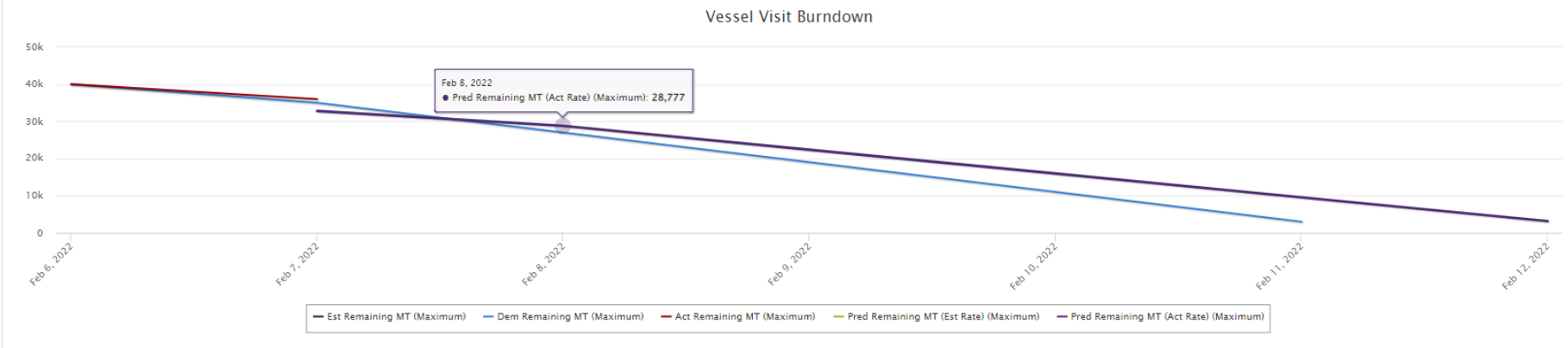
1-10 Of 26

< 1 Of 3 >

10 Results per Page

Vessel Visit
Arklow Forest - 22-000012

Vessel Visit Burndown

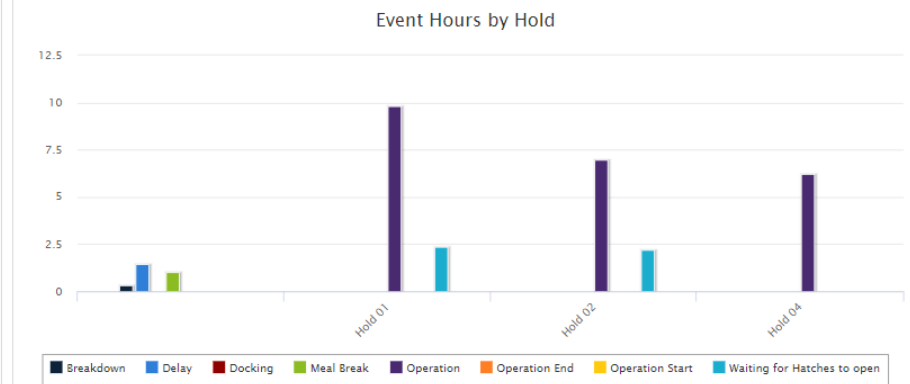


Vessel Visits Statistics

Vessel Visits Statistics

Category	Opening (MT)	Rate	Operating Rate	Remaining (MT)	Arrival	Completion	Demurrage	Bonus / Penalty
Estimated	40,000	8,000	333	32,785	02-06-22 09:00	02-06-22 14:00	02-11-22 09:00	7,187
Actual	40,000	267	333	32,785	02-06-22 09:00	02-07-22 13:00	02-11-22 09:00	5,750
Predicted (Est)	40,000	8,000	333	32,785	02-06-22 09:00	02-07-22 14:00	02-11-22 09:00	5,687
Predicted (Act)	40,000	267	333	32,785	02-06-22 09:00	02-12-22 12:00	02-11-22 09:00	-5,063

Event Hours by Hold



Apply

Laytime

Customer:

Vessel Name:	Arklow Forest	Demurrage Rate:	4,500.00	per Day	per Hour
Bill of Lading (MT):	40,000.000				
Operating Rate (MT per Day):	8.000	Despatch Rate:	1,500.00		62.50

NOR Tendered: 06-Feb-22 08:30
Vessel Berthed: 05-Feb-22 09:29
Operations Commenced: 06-Feb-22 09:41
Time Starts to Count: 06-Feb-22 09:00
Operations Completed:

Time Allowed:	5000d, 0h, 0m	Productivity Rates	per Day	per Hour
Adjusted Time Allowed:		Contractual:	8.00	0.33
Total Time Used:		Adjusted Contractual:		
Laytime Used:	1d, 5h, 26m	Average:		
		Actual:	32,616.11	1,359.00

Time Gained: 4998d, 18h, 34m
Despatch on Vessel: 7,498,160.416

Event Start	Event End	Event Description	Event Duration	Cumulative Event Duration	Time to Count	Cumulative Laytime Used
06-Feb-22 08:30	06-Feb-22 08:30	First Line	0d, 0h, 0m	0d, 0h, 0m	No	0d, 0h, 0m
06-Feb-22 09:00	06-Feb-22 09:50	Removing Hatch Covers	0d, 0h, 50m	0d, 0h, 50m	Yes	0d, 0h, 50m
06-Feb-22 09:52	06-Feb-22 10:10	Hatch Covers	0d, 0h, 18m	0d, 1h, 8m	Yes	0d, 1h, 8m
06-Feb-22 09:53	06-Feb-22 09:53	Vessel Operations Start	0d, 0h, 0m	0d, 3h, 8m	No	0d, 3h, 8m
06-Feb-22 09:53	06-Feb-22 11:53	Vessel Discharging	0d, 2h, 0m	0d, 3h, 8m	Yes	0d, 3h, 8m
06-Feb-22 10:13	06-Feb-22 11:53	Vessel Discharging	0d, 1h, 40m	0d, 4h, 48m	Yes	0d, 4h, 48m
06-Feb-22 11:53	06-Feb-22 11:53	Vessel Operations Stopped	0d, 0h, 0m	0d, 5h, 30m	No	0d, 5h, 30m
06-Feb-22 11:53	06-Feb-22 12:35	Heavy Rain	0d, 0h, 42m	0d, 5h, 30m	Yes	0d, 5h, 30m
06-Feb-22 12:35	06-Feb-22 12:35	Vessel Operations Start	0d, 0h, 0m	0d, 5h, 30m	No	0d, 5h, 30m
06-Feb-22 12:36	06-Feb-22 13:10	Hatch Covers	0d, 0h, 34m	0d, 6h, 4m	Yes	0d, 6h, 4m
06-Feb-22 13:10	06-Feb-22 13:50	Hatch Covers	0d, 0h, 40m	0d, 7h, 42m	Yes	0d, 7h, 42m
06-Feb-22 13:10	06-Feb-22 13:48	Vessel Discharging	0d, 0h, 38m	0d, 7h, 42m	Yes	0d, 7h, 42m
06-Feb-22 13:10	06-Feb-22 13:30	Equipment Breakdown	0d, 0h, 20m	0d, 7h, 42m	Yes	0d, 7h, 42m
06-Feb-22 13:49	06-Feb-22 14:49	Lunch Break	0d, 1h, 0m	0d, 9h, 28m	No	0d, 8h, 28m
06-Feb-22 13:49	06-Feb-22 13:49	Vessel Operations Stopped	0d, 0h, 0m	0d, 9h, 28m	No	0d, 8h, 28m
06-Feb-22 13:49	06-Feb-22 14:35	Heavy Rain	0d, 0h, 46m	0d, 9h, 28m	Yes	0d, 8h, 28m
06-Feb-22 14:49	06-Feb-22 15:15	Hatch Covers	0d, 0h, 26m	0d, 9h, 54m	Yes	0d, 8h, 54m
06-Feb-22 15:16	06-Feb-22 18:17	Vessel Discharging	0d, 3h, 1m	0d, 12h, 55m	Yes	0d, 11h, 55m
06-Feb-22 15:30	06-Feb-22 16:10	Hatch Covers	0d, 0h, 40m	0d, 13h, 35m	Yes	0d, 12h, 35m
06-Feb-22 16:17	06-Feb-22 18:17	Vessel Discharging	0d, 2h, 0m	0d, 15h, 35m	Yes	0d, 14h, 35m
06-Feb-22 18:20	06-Feb-22 18:20	Vessel Operations Stopped	0d, 0h, 0m	0d, 15h, 35m	No	0d, 14h, 35m
07-Feb-22 06:15	07-Feb-22 12:30	Vessel Discharging	0d, 6h, 15m	0d, 21h, 50m	Yes	0d, 20h, 50m
07-Feb-22 07:30	07-Feb-22 07:30	Vessel Operations Start	0d, 0h, 0m	0d, 21h, 50m	No	0d, 20h, 50m
07-Feb-22 07:44	07-Feb-22 08:15	Hatch Covers	0d, 0h, 31m	0d, 22h, 21m	Yes	0d, 21h, 21m
07-Feb-22 08:20	07-Feb-22 12:30	Vessel Discharging	0d, 4h, 10m	1d, 2h, 31m	Yes	1d, 1h, 31m


TIBCO Jaspersoft
superuser Help Log Out

Vessel Visit OEE

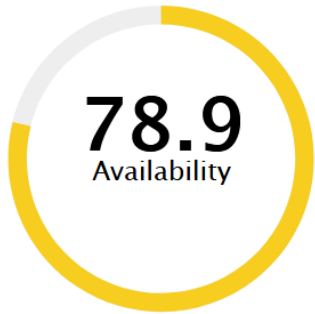
Visit ID

MV ZOE S (S-000006)

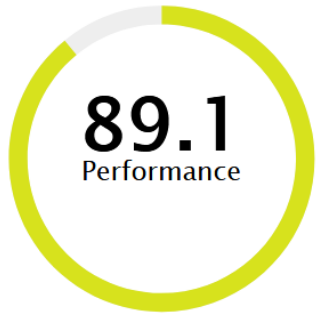
Vessel Visit OEE




70.3
Overall OEE



78.9
Availability



89.1
Performance



100.0
Quality

Vessel Visit OEE Events

Event Type	Event Classification	Event Start	Event End	Event Duration (mins)	Is Short Break	Is Meal Break	Is Delay
Delay	Waiting For Barges	24-Apr-2020 04:25:00	24-Apr-2020 05:50:00	85	No	No	Yes
Delay	Waiting For Barges	24-Apr-2020 04:25:00	24-Apr-2020 05:50:00	85	No	No	Yes
Delay	Waiting For Barges	24-Apr-2020 04:25:00	24-Apr-2020 05:50:00	85	No	No	Yes
Operation	Barges Arrived	24-Apr-2020 05:50:00	24-Apr-2020 08:25:00	155	No	No	No
Delay	Waiting For Barges	24-Apr-2020 04:25:00	24-Apr-2020 05:50:00	85	No	No	Yes
Delay	Weather Delay (Rain/Wind)	24-Apr-2020 08:25:00	25-Apr-2020 01:40:00	1,035	No	No	Yes
Delay	Weather Delay (Rain/Wind)	24-Apr-2020 02:00:00	24-Apr-2020 04:25:00	145	No	No	Yes

Vessel Visit OEE Stock Moves

Direction	Movement Status	Parent Product	Product	Movement Start	Movement End	Movement Duration (m ins)	Cargo Handled (MT)
Incoming	Complete		Bulk Bauxite	24-Apr-2020 12:00:00	25-Apr-2020 03:00:00	900	1,028.800
Incoming	Complete		Bulk Bauxite	24-Apr-2020 12:00:00	25-Jun-2020 03:00:00	88,740	1,028.800
Incoming	Complete		Bulk Bauxite	24-Apr-2020 12:00:00	25-Apr-2020 03:00:00	900	1,028.800
Incoming	Complete		Bulk Bauxite	24-Apr-2020 12:00:00	25-Jun-2020 03:00:00	88,740	1,028.800
Incoming	Complete		Bulk Bauxite	25-Apr-2020 03:01:00	26-Apr-2020 03:00:00	1,439	1,940.200
Incoming	Complete		Bulk Bauxite	25-Apr-2020 03:01:00	26-Apr-2020 03:00:00	1,439	1,940.200
Incoming	Complete		Bulk Bauxite	24-Apr-2020 12:00:00	25-Apr-2020 03:00:00	900	1,028.800
Incoming	Complete		Bulk Bauxite	25-Apr-2020 03:01:00	26-Apr-2020 03:00:00	1,439	1,940.200
Incoming	Complete		Bulk Bauxite	26-Apr-2020 03:01:00	27-Apr-2020 03:00:00	1,439	1,824.800
Incoming	Complete		Bulk Bauxite	25-Apr-2020 03:01:00	26-Apr-2020 03:00:00	1,439	1,940.200
Incoming	Complete		Bulk Bauxite	25-Apr-2020 03:01:00	26-Apr-2020 03:00:00	1,439	1,940.200
Incoming	Complete		Bulk Bauxite	25-Apr-2020 03:01:00	26-Apr-2020 03:00:00	1,439	1,940.200
Incoming	Complete		Bulk Bauxite	25-Apr-2020 03:01:00	27-Apr-2020 03:00:00	1,439	1,824.800
Incoming	Complete		Bulk Bauxite	26-Apr-2020 03:01:00	27-Apr-2020 03:00:00	1,439	1,824.800

Apply

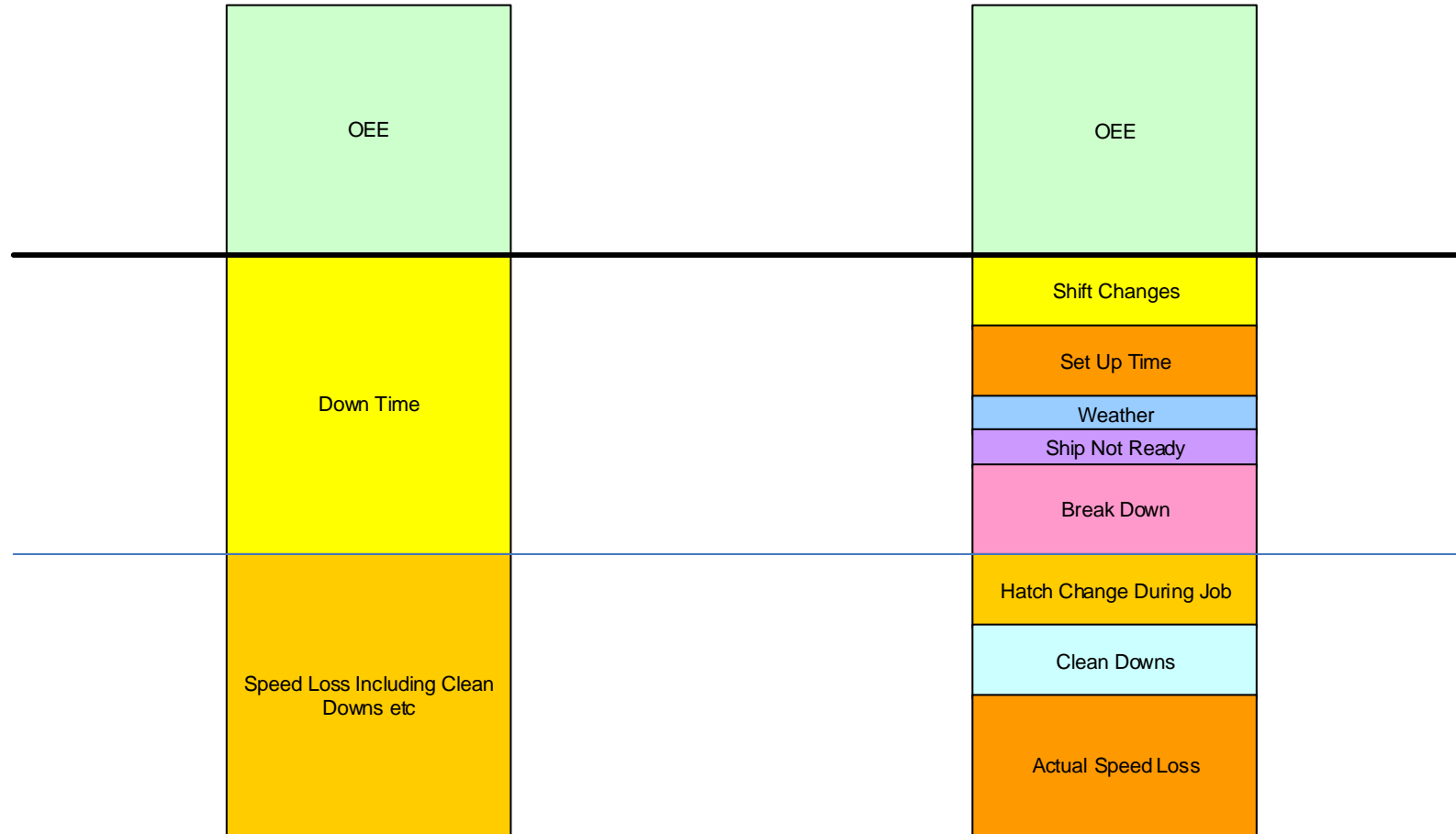


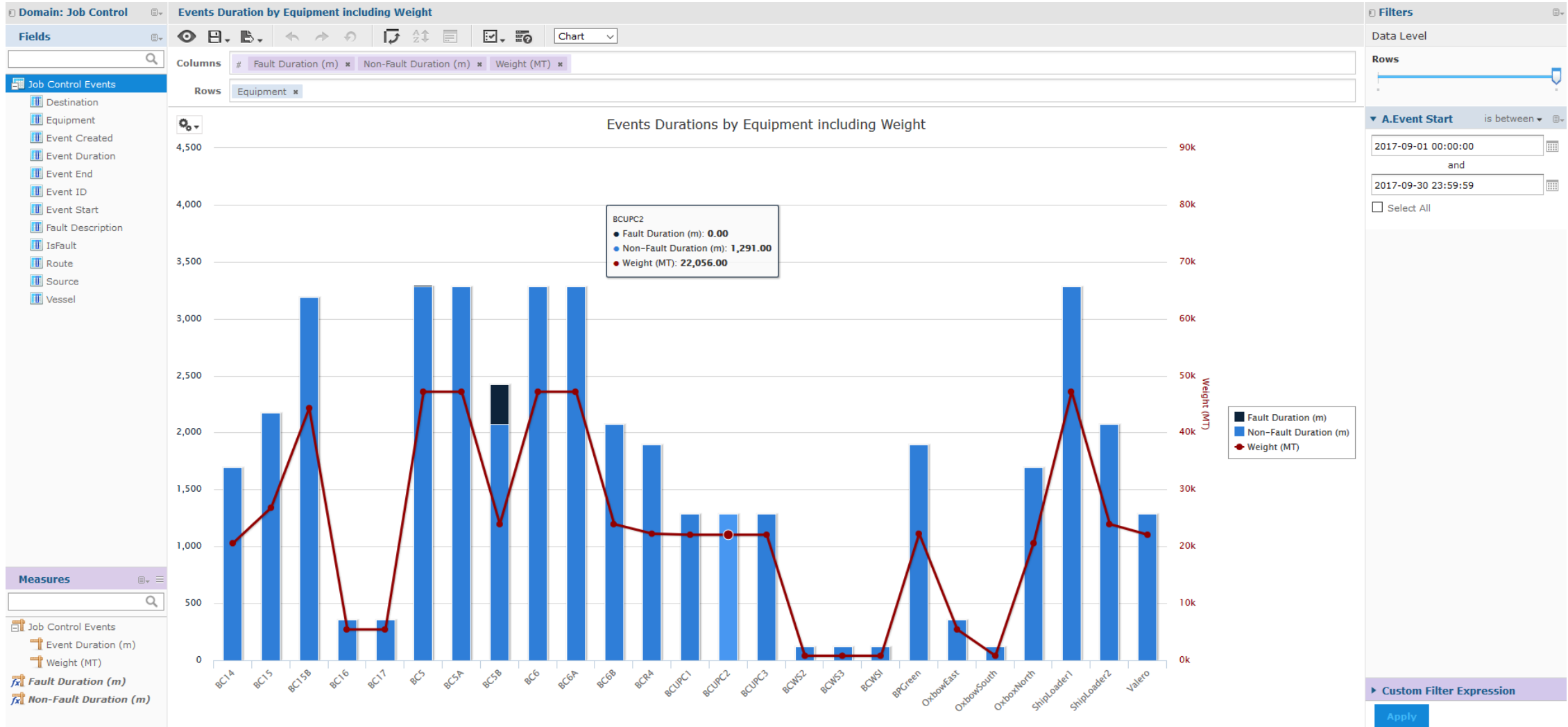
Root Cause Analysis

Knowing that losses are occurring doesn't improve performance

- ✓ | Analysis of the root causes of stoppage or speed loss is necessary for improvement to take place
- ✓ | “Low hanging fruit” needs to be targeted first
- ✓ | Focus on the largest causes of underperformance brings about the most significant gains

Peel the onion



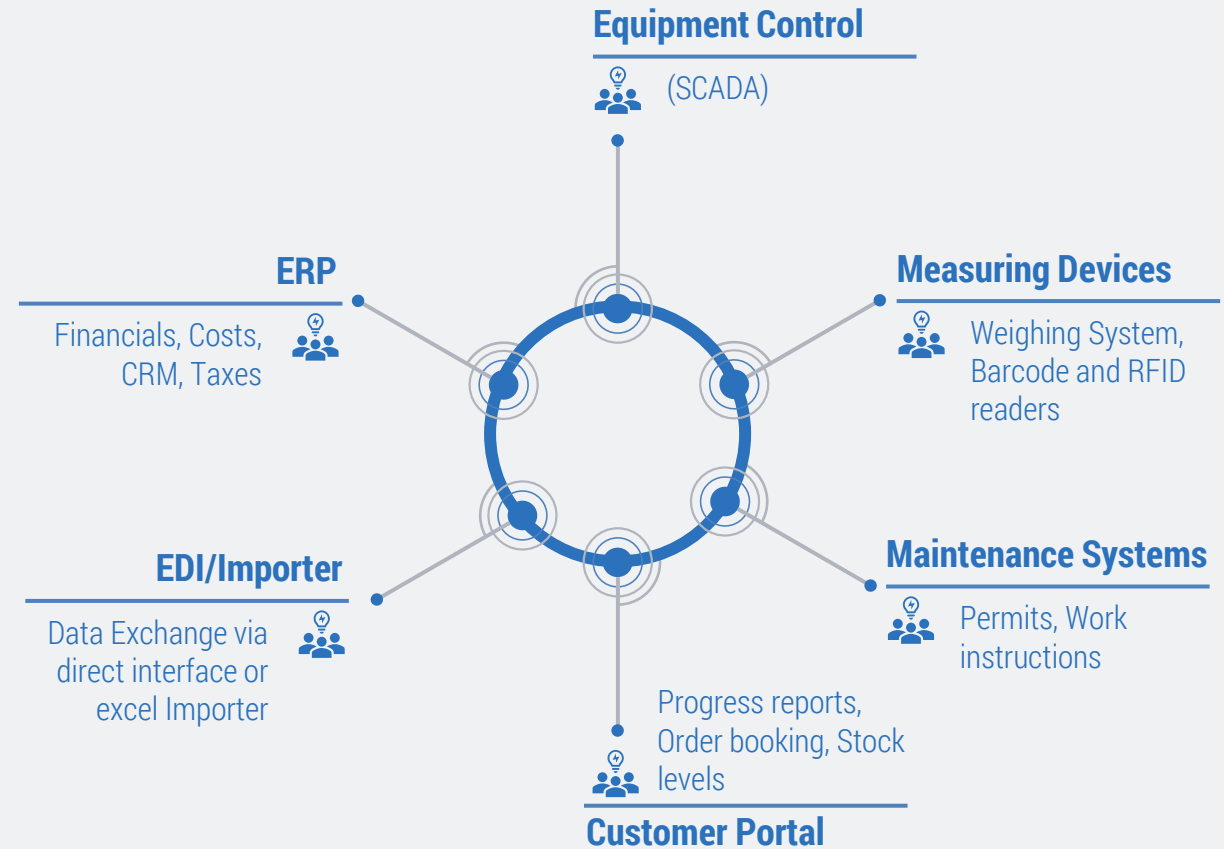
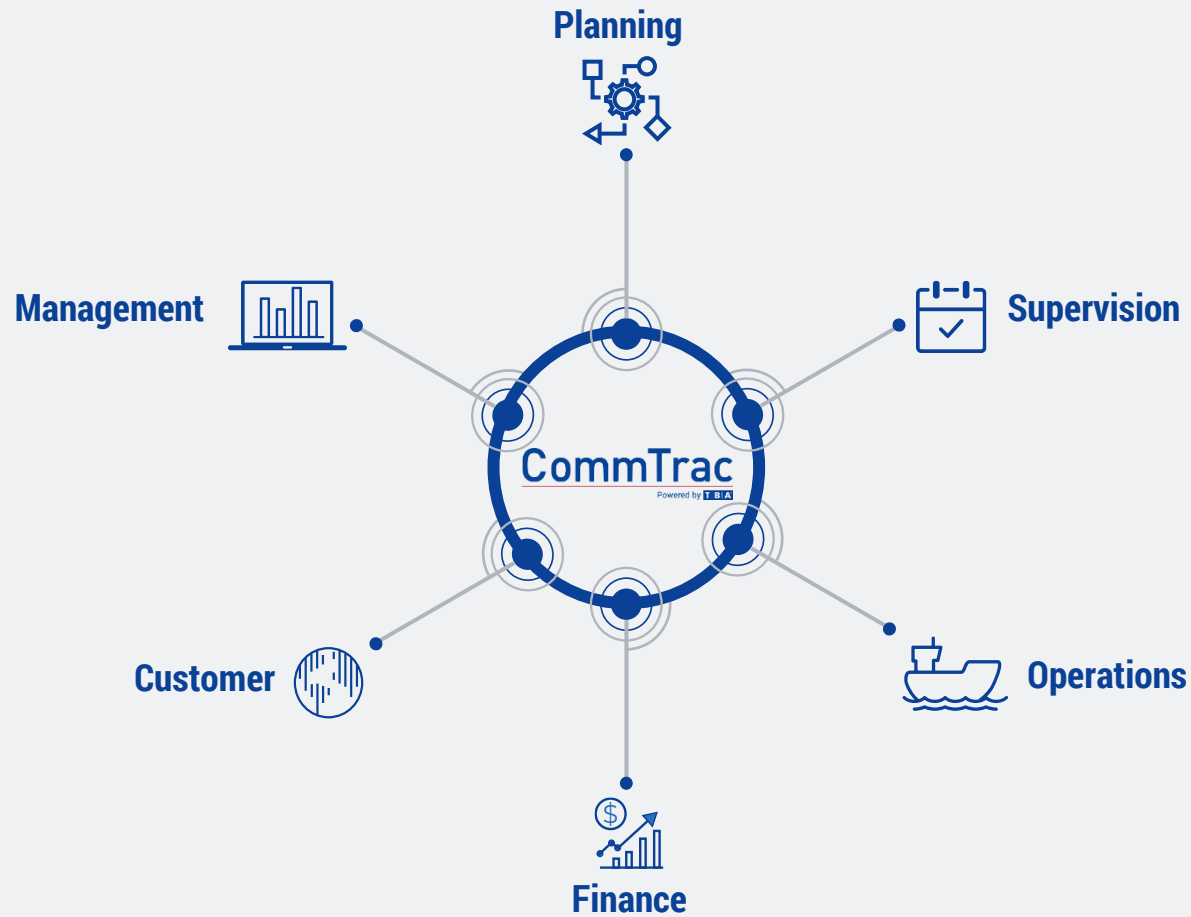


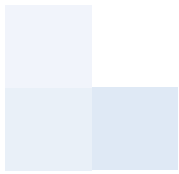
- ✓ | Stop the feed not the conveyor system for minor stops
- ✓ | “Hot swap” at shift changes
- ✓ | Find the TPH bottleneck and remove it
- ✓ | Equipment checks during weather delays
- ✓ | Cream dig the next hatch whilst the dozers are cleaning up
- ✓ | Renegotiate rates on known bad ships or cargos



Trusting the data

- ✓ | Not captured after the fact
- ✓ | Not handwritten
- ✓ | Not collected by 3rd parties (Independent superintendents)
- ✓ | Mobile applications can digitize traditionally manually capture data
- ✓ | System data, especially from the real time, automation layer is most effective





- ✓ | OEE and Root Cause Analysis are recognised, comparable methods to implement continuous improvement strategies
- ✓ | Using trustworthy data is essential if the results are to be trusted and improvement plans effective
- ✓ | Improvements in performance generally be realised in a series of quick wins and up to 10% improvements in efficiency followed by incremental gains over time
- ✓ | The P&L will be the ultimate KPI and provided the data is acted upon there will be an EBIT improvement in all cases

Thank YOU!

Questions?

TBA Doncaster Ltd
Unit 4, Railway court
Ten Pound Walk
Doncaster DN4 5FB
United Kingdom

T: +44 (0)1302 330837
tdo-sales@tba.group