Performance Management System

Sverre Patursson Vange, Head of Performance Management

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LAURITZEN KOSAN

Lauritzen Kosan

- **Ship-owner**
  - Own vessels, Joint ventures, Bare Boat and Time Charter, Pool Partners
- **Operates approx. 40 LPG carriers from Copenhagen and Singapore**
  - Commercial Pools of Ethylene and Semi-refs
- **Technical Management of approx. 25 LPG carriers**
  - Management from Copenhagen but also technical personnel in Manila
- **Crews from Philippines, Spain and Cuba**
  - Crewing office in Manila

Collection of Performance Data

What is needed, what would be nice to have, what do we have, and what can we get

- **Speed, Consumption, Condition (Ballast/Laden) and Weather data are minimum requirements**
  - Is a must to know in case of disputes related to Commercial agreements, e.g. a Charter Party
  - Enables simple evaluation of “raw” vessel performance
  - Quality and accuracy can limit the reliability of the evaluation…
- **More detailed analysis of Vessel Performance requires more data …**
  - Trim
  - Propeller RPM’s, Power, Torque, - and Pitch for vessels with controllable pitch propeller
  - Main Engine RPM’s, Load percentage, Lube Oil consumption, Turbocharger speed, etc.
  - Consumption and production of Auxiliaries, Cargo Plants, PSA plants, etc.
- **Some data might be available but just not used**
  - Detailed Weather data from Weather Services can be obtained based on time and position
  - Main Engine Performance reports may be reported recurrently, but no gathering and trending of data is done on-board nor at office
  - Oil sample analysis reports are just archived in the mail system
  - …
- **Make an overview of what you got and what you eventual might need**

Establishment of Key Performance Indicators

What can be measured and what makes sense

- **Fuel Efficiency KPI's**
  - Fleet – Fuel Efficiency, fuel used per unit transport work [g/tNM], pseudo EEOI
  - Vessel – Speed loss, deviation from expected speed for given consumption
  - Captain – Slip, deviation from theoretical propeller distance to actual LOG distance
  - Chief Engineer – SFOC, fuel used to produce power [g/kWh]

- **Lots of other relevant KPI's**
  - Vetting
    - Deficiencies
    - Crew related findings
  - Technical Management
    - Off service days (scheduled/unscheduled)
    - Overdue maintenance jobs
    - OPEX
  - HSSEQ
    - Near Miss Frequency
  - HR
    - Officer Retention Rate

- **Most of the data is already there, but it is just tedious to collect and present…**

Establishment of a Performance Management System

Make the data accessible and clear

- **Identifying the sources**
  - Mail queues or archives with standard reports
  - Excel sheets maintained regularly
  - Programs used on-board or ashore

- **Finding the Tools and Resources**
  - Lots of hits if you google “Business Intelligence Tools”
  - Basic software/programming skills, especially SQL, needed

- **Extracting and Merge the data into a data warehouse**
  - Copy data from the sources regularly, e.g. every night
  - Enrich data where possible:
    - Weather info based on time and position
    - Skip old data, e.g. from sold vessels
    - Filter redundant data from different sources (identify the most reliable)
    - Normalise Vessel Performance data with respect to Weather
  - Restructure data
    - Ensure vessel, crew, port name etc. are identically spelled
    - Split data into lowest unit of interest (e.g. year/month/week/day/hour/minute/…)

Presenting the data

Make the data accessible and clear

- **Identify the users**
  - Top Management
  - Commercial staff
  - Technical staff
  - Crews

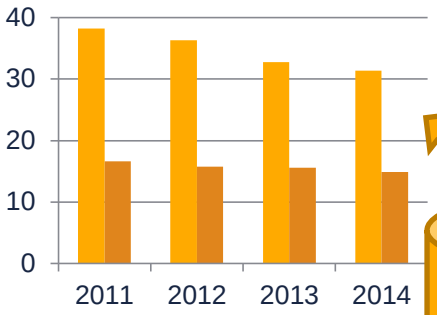
- **Identify the user types**
  - Some only want, or have time for, a precompiled report
  - Others have, or takes, the time to “dig-around” in the data

- **Automate the reporting**
  - Make and email daily/weekly/monthly or otherwise recurrent reports
    - End of Voyage report for operation/technicians/crew
    - Weekly T/C out report for operation
    - Daily performance report for technical staff
    - …
  - Expose ALL data in one or more “cubes”
    - Accessible from Excel with Pivot-like-interface

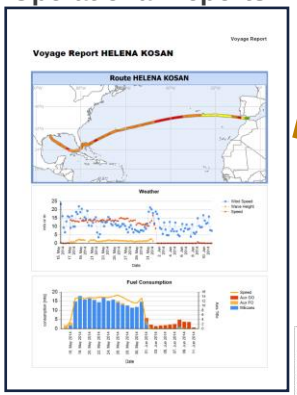
Performance Management System - overview

Simple overview of Lauritzen Kosan data flow

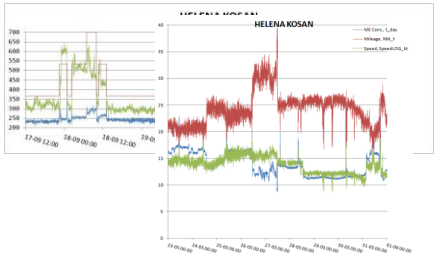
Management Reports



Operational Reports



Technical Reports



LK Data Warehouse

Vessel Performance

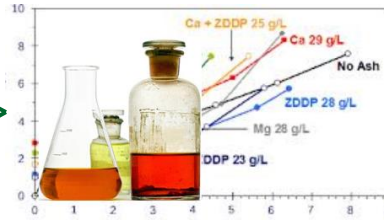
Technical Operation *SERTICA*

Crewing *OMEGA*

Commercial Operations *IMOS*

Accountancy *NAVISION*

Weather Data

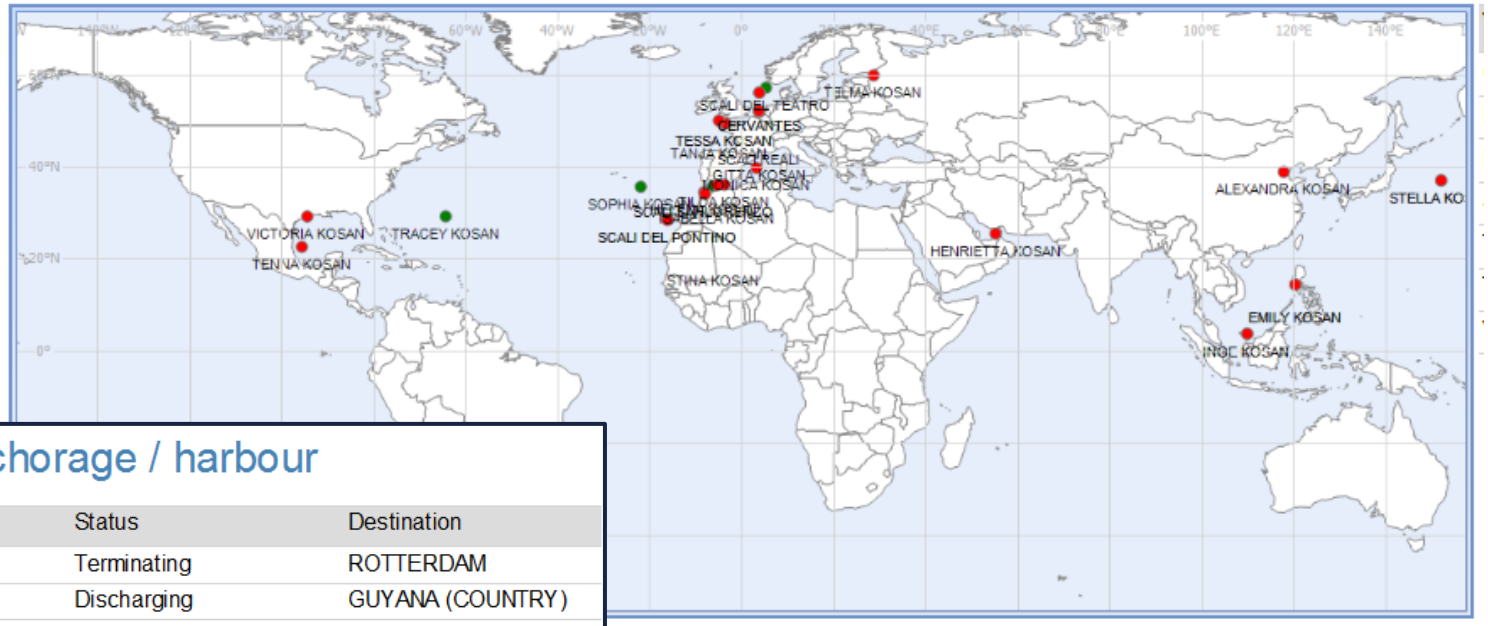


Test sample analysis

LAURITZEN KOSAN

Vessel Overview - Dashboard

Lauritzen Kosan Performance Management System



Vessels at anchorage / harbour

Vessel Name	Status	Destination
GITTA KOSAN	Terminating	ROTTERDAM
HELLE KOSAN	Discharging	GUYANA (COUNTRY)
MONICA KOSAN	Discharging	ALCUDIA
SCALI REALI	Loading	BILBAO
TANJA KOSAN	Discharging	ELLESMERE PORT
TELMA KOSAN	Discharging	GDYNIA
VICTORIA KOSAN	Discharging	COATZACOALCOS

Status on On-board Units

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Auto-Logged Data

Main Engine &/ Boiler	Main Engine					Torque	Boiler			
Vessel Name	Cons.	Temp	Density	0-val Fwd	0-val Rtn	Torque	Mass Flow	Density	Temp	Zero-val
HELENA KOSAN										
ISABELLA KOSAN										
STINA KOSAN										
TANJA KOSAN										
TELMA KOSAN										
TENNA KOSAN										
TILDA KOSAN										
HENRIETTA KOSAN										
SOPHIA KOSAN										
STELLA KOSAN										
TESSA KOSAN										
VICTORIA KOSAN										

Power Generation	Aux 1	Aux 2	Aux 3	Fuel Oil Consumption Auxilleries				Gas Oil Consumption Auxilleries				SG
Vessel Name	G1 Power	G2 Power	G3 Power	Aux Fwd	Aux Rtn	0-val Fwd	0-val Rtn	Aux Fwd	Aux Rtn	0-val Fwd	0-val Rtn	Power
HELENA KOSAN												
ISABELLA KOSAN												
STINA KOSAN												
TANJA KOSAN												
TELMA KOSAN												
TENNA KOSAN												
TILDA KOSAN												
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TESSA KOSAN												
VICTORIA KOSAN												

End of Voyage items

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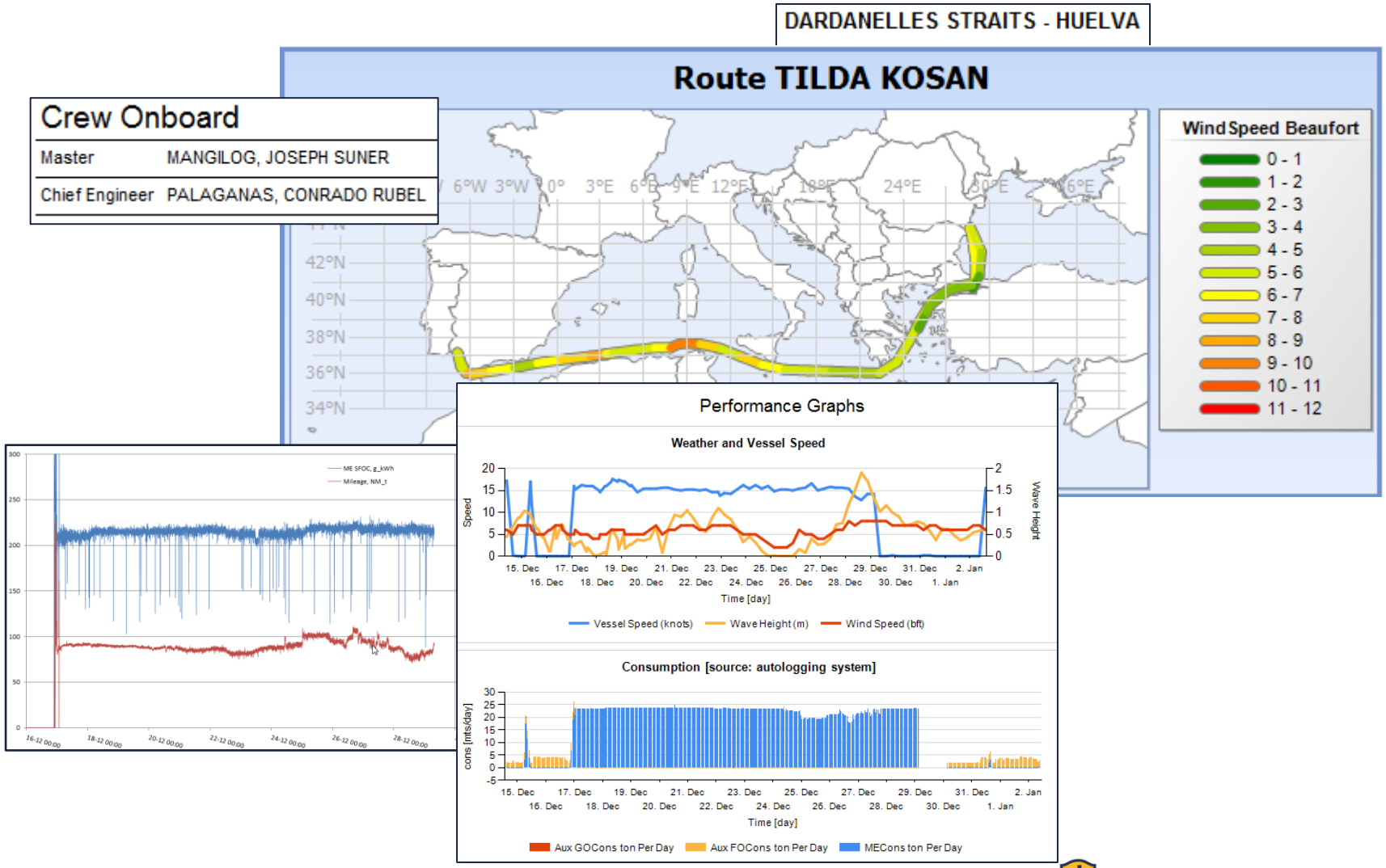

Maintenance Status

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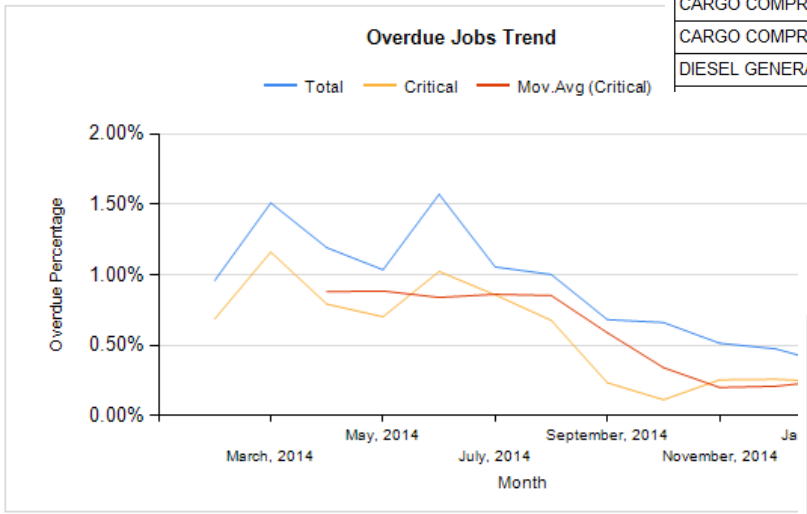
Lube Oil Overview SCALI DEL TEATRO

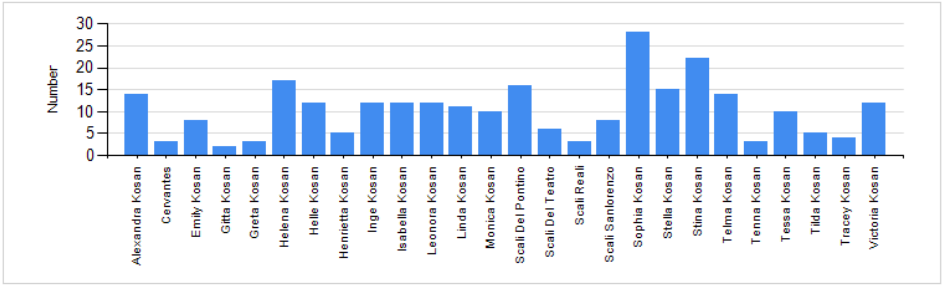
Only months where reports are received will be displayed in the matrix

Componentdesc	April	June	July	September	December
BOW THRUSTER					
CARGO COMPRESSOR #1					
CARGO COMPRESSOR #2					
DIESEL GENERATOR #1					



Critical Spare Part Below Minimum Stock

The below list shows all critical spares below the minumum spare part limit.



Planned Maintenance Overdue for month: 1

Name	Total	Critical	On
Telma Kosan	3.60%	0.00%	
Tanja Kosan	2.12%	2.90%	
Leonora Kosan	0.83%	0.00%	
Gitta Kosan	0.57%	0.00%	

Vessel Name	Spare Part Name	Spare Part Number	Minimum Stock	Actual Stock
Alexandra Kosan	Sealkit	813.017.042	1	0
Alexandra Kosan	Temperature Transmitter (TE 8107) Thust Bearing	792.001.585	1	0
Alexandra Kosan	Pressure Transmitter (PT 8108) Lub Oil Inlet	792.001.586	1	0

Evaluation of Pool Performance

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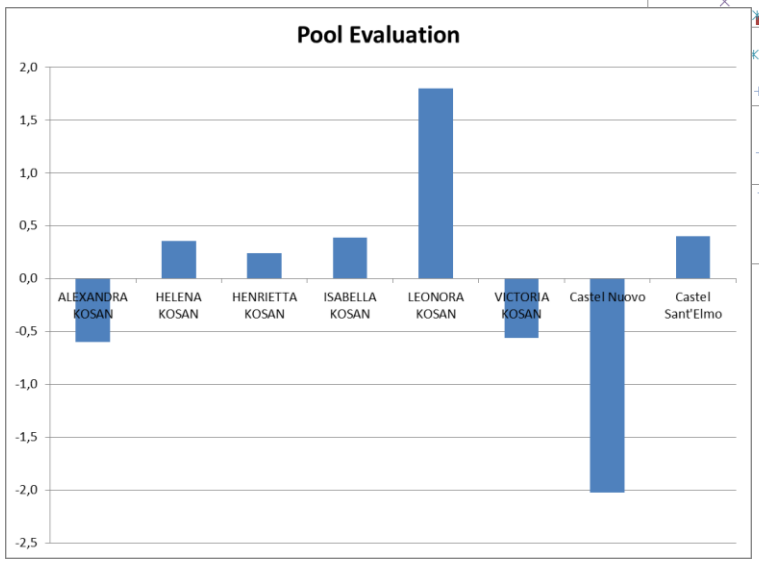

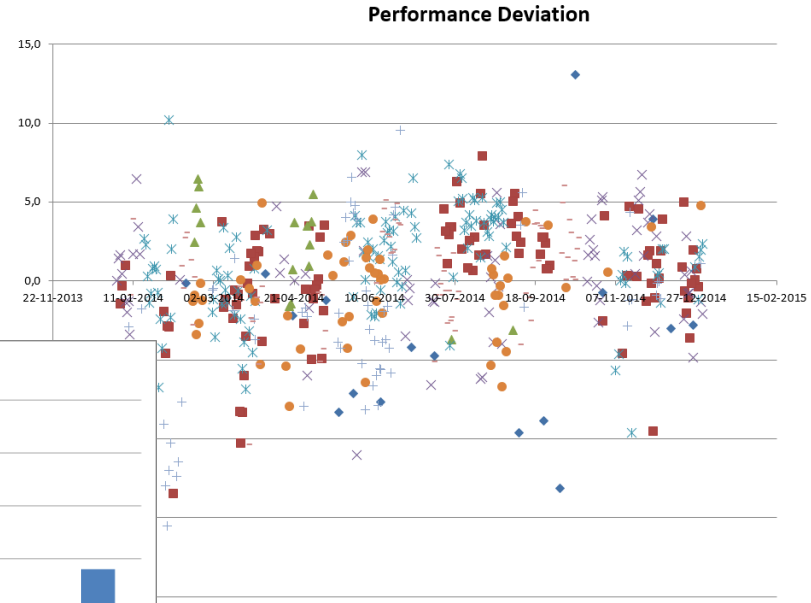

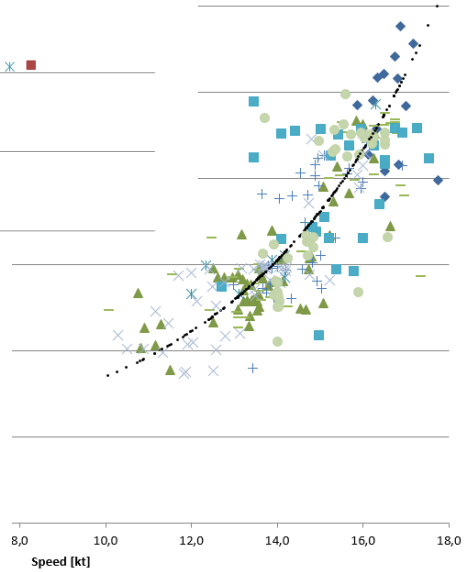

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Evaluation of Fuel Efficiency

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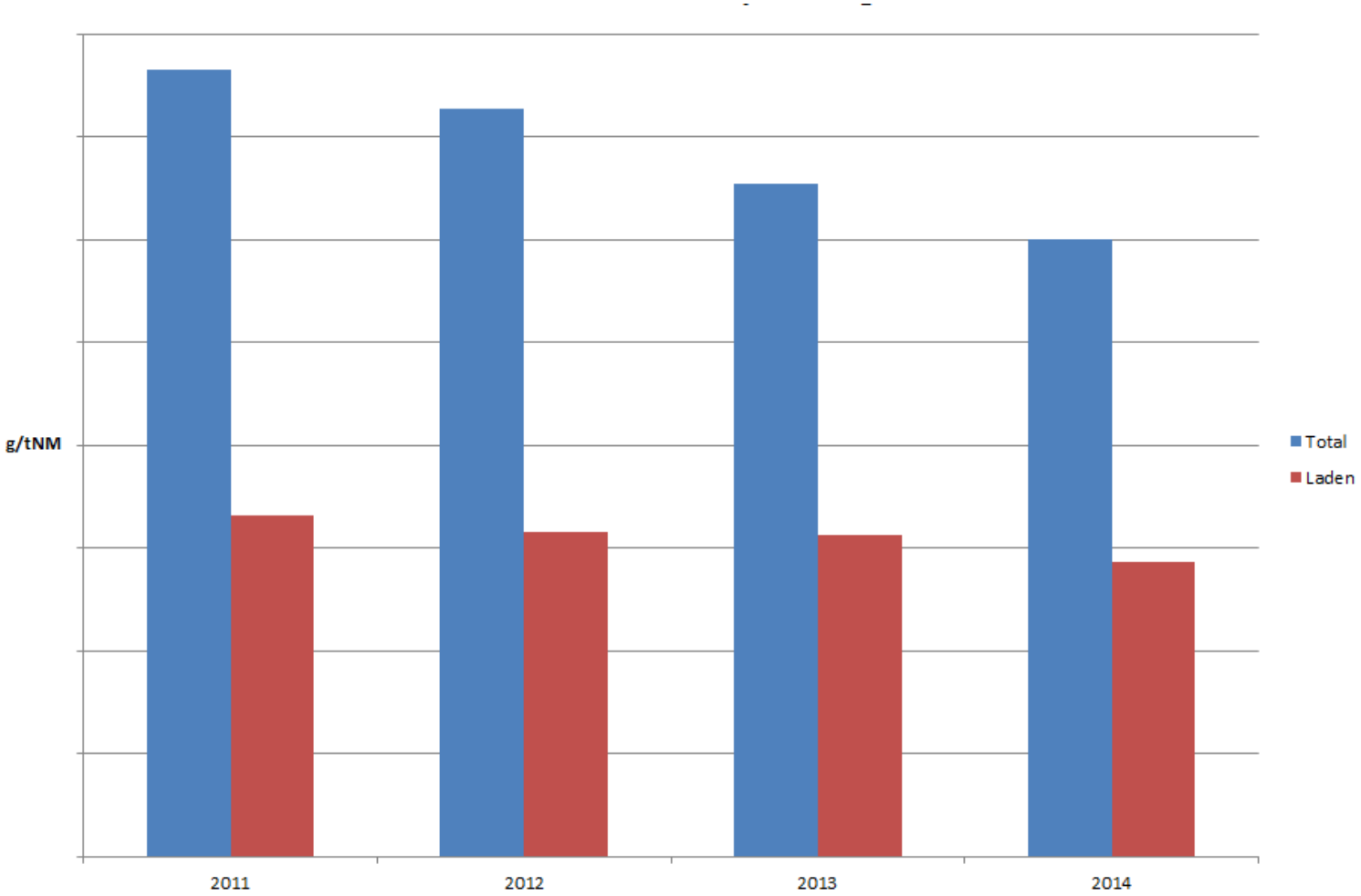

Thank you for your time!

Any questions?