

### Developing Supply Chain Management System Using DDMRP

Sergey Likharev, Vice President for Logistics; Alexander Oganezov, project manager Demand Driven World 2018, Frankfurt, October 11, 2018



#### NLMK is Russia's largest steel manufacturer – and the 16<sup>th</sup> largest in the world – with 17 million tons production and 72 million tons cargo turnover per year TOP5



NLM

### NLMK Logistics strategy 2014-2017 was focused on cost optimization



- Sensitivity to the quality of logistics services in heavy industry is relatively low in comparison with other sectors. Average OTIF:
  - Heavy industry, steel making ~85%
  - Household Appliances ~90%
  - FMCG and Pharma >95%
- Logistics costs are 10-60% of revenue
- Maintaining a certain level of quality of service is possible due to additional stocks, since the cost of maintaining stocks is relatively low (comparable to WACC), the shelf life of products is not limited
- Priorities for logistics optimization for steel making companies:
  - Costs optimization
  - Inventory optimization
  - Improvement of the quality of service



NLM

## Significant gains achieved in 2014-2017: \$48M cost savings, \$45M working capital optimization, \$42M improvement of commercial terms ...





NLM

Developing Supply Chain Management System Using DDMRP

### ... However lots of challenges persisted in supply chain management



From the supply of raw materials to mineral companies to the shipment of the finished products

#### Key Challenges

- Long lead time from raw material suppliers to end customers
- Short orderbook as well as challenging deliver requirements from customers
- ▶ High variability within the supply chain on both, demand and supply side
- Lack of transparency for decision making (gaps in the area of inventories and service level)
- Potential to improve level of integration in SC planning and raw material procurement





## NLMK selected CAMELOT as thought leader in supply chain management and experienced DDMRP implementation partner to jointly overcome the challenges







Russian Supply Chain Community: Barkawi MC, Pierau Planung, Visagio, HPM Log, Oliver Wight, Manhattan Inc, FLO, Armstrong & Associates Total Logistics, AT Kearney Gartner: Barkawi MC, Chainalytics, enVista, Fortna, Miebach Consulting, Sedlak, Tompkins Int., Accenture, Bearing Point, Capgemini, Deloitte, EY, Hitachi MC, IBM GBS, KPMG, Strategy&

Short list: Barkawi MC, Strategy&, Camelot MC, McKinsey, ATKearney, Capgemini, Chainalytics

ALM Intelligence Research: AT Kearny, BCG, Deloitte, McKinsey, Accenture, Capgemini, CGI, EY, Strategy&, Barkawi MC, Camelot MC, Chainalytics Personal recommendations: McKinsey, Strategy&, Camelot MC, Barkawi MC

- **Thought leader in supply chain management** providing leading practices for future NLMK supply chain design
- Experienced partner for successful DDMRP implementations across industries...
  - ...enabling **thought ware change** through trainings and know-how transfers
  - ...ensuring **optimum conceptual DDMRP design** as basis for implementation
  - ...providing leading DDMRP software solutions based on SAP technology
- "Digital frontrunner" actively driving innovations in supply chain management





## The goal of the project was to implement the best practices in client service and inventory replenishment with a focus on international subsidiaries



#### Major changes achieved during the project

#### Service level

- OTIF calculation for the full chain harmonized
- Framework for data collection and visualization has developed
- OTIF management and root-cause analysis process and responsibilities defined
- Monetization approach and next steps for communication with clients described

#### Replenishment

- DDMRP buffer allocation and replenishment tools developed and applied for Clabecq slabs and finished products planning, La Louviere and PA planned till the end of 2018
- DDMRP replenishment for slabs from Lipetsk to Clabecq started in September
- Replenishment for pilot Q&T warehouses based on DDMRP started in July

#### E2E SCM

- E2E planning and replenishment processed developed and implemented
- Roles and responsibilities defined and aligned with current structure
- High level IT requirement defined and aligned with IT strategy
- Inventory level and service level metrics defined (FLOW metrics)





#### End-to-End OTIF calculation was established for Lipetsk-Clabecq supply chain achieving OTIF stabilization throughout the entire supply chain Finished





to enable automated root-cause analysis

production after calendar

planning implementation

## To improve unsatisfactory OTIF performance, root-cause analysis for Clabecq's OTIF is performed each month



The reasons are shown in pyramids in the order of prioritization for analysis – if the first reason haven't happened – check the second

CP:

.

۲

- For analysis of CP OTIF, databases with information on processing of products through production stages in comparison with target dates. Analysis is manually handled by groups of order lines reasons assigned in the order of reasons according to the pyramids (see left).
- Q&T:
  - Detailed data are not available yet, so the analysis is made on significant root causes. The first focus for further IT development is to start to collect data for Q&T OTIF based on the experience gained for CP

|             | Production instability  | ATP (Available to promise) for<br>Q&T is not stable  | Non-OTIF<br>rolling  | Actual lead time<br>instability   |
|-------------|---|--|--|---|
| Description | <ul> <li>Production instability:</li> <li>Productivity lower<br/>than forecasted</li> </ul>   | <ul> <li>Available to promise process<br/>incomplete</li> <li>Some specific isn't taken in<br/>account</li> </ul>  | <ul> <li>Re-rolling<br/>because of<br/>quality issues</li> </ul> | <ul> <li>Delays on<br/>different<br/>production<br/>stages</li> </ul>                   |
| Action plan | <ul> <li>Remontada project<br/>started</li> <li>Structural re-levelling<br/>shift organization</li> <li>UP to 5% improvement<br/>in 2018</li> </ul> | <ul> <li>ATP upgrade for QT<br/>integrating plasma capacity<br/>limitation</li> <li>Lead time revision for QT</li> <li>UP to 5% improvement in<br/>2018</li> </ul> | <ul> <li>Minimizing the<br/>number of re-<br/>rolling</li> </ul> | <ul> <li>Develop aging<br/>KPIs to track<br/>plates<br/>without<br/>movement</li> </ul> |



## The lead time Lipetsk-Clabecq-Customer is very long and variable placing lots of challenges on supply chain planning and execution





DDMRP with the logic to cut the supply chain into pieces by strategically placing inventory buffers was identified as the best solution to cover LT challenges and absorb variabilities from demand and supply side





## Buffers were calculated per SKU, applying individual planning parameters – it allows to have lower but sufficient stock level in comparison actual data

#### Real examples of slabs replenishment based on DDRMP

 160 slab SKUs analyzed in detail on detailed chemistry



- Buffer are not static and recalculated over time
- Quarterly review of buffer & inventory quality (using tactical FLOW metrics) to identify areas for improvement
- Alignment between Local Inventory & Repl. Planner and E2E Inventory & Repl. Manager on parameter adaptions to improve buffer performance





### The DDMRP methodology was implemented in the Lipetsk – Clabecq supply chain for slabs enabling significant stock decrease







### For selected finished goods warehouses pilot with usage of DDMRP has started, DDMRP supports the low level of finished goods stock





# To successfully operate the NLMK multi-stage supply chains with inventory and customer service improvement, the implementation of specific supply chain roles

#### was necessary





In the current organizational structure operation level is already exists, for tactical level only 3 additional positions needed – for Clabecq finished goods warehouses management, for Group slabs replenishment and OTIF coordination





CAMELO

ement Consultants

### Expected benefits – increase of revenue after service level improvement and stock level decrease enables by DDMPR implementation

| OTIF              | improvement            | re                    | Up to 1-2%<br>revenue increase |  |  |
|-------------------|------------------------|-----------------------|--------------------------------|--|--|
| Inventory savings |                        |                       |                                |  |  |
|                   | Q&T (slabs)            | CP (slabs)            | Q&T (slabs)                    |  |  |
| NLMK Clabecq      | 136 → 79 days<br>(42%) | 69 → 53 days<br>(23%) | 120 → 112 days<br>(7%)         |  |  |
| NLMK La Louviere  | 53 → 51 days (4%)      |                       |                                |  |  |
| NLMK USA          | 70 → 67 days (4%)      |                       |                                |  |  |





Next steps: AI Demand pattern recognition and forecasting model can boost the performance up to 99% forecast accuracy which will allow to further decrease inventory levels based on more realistic ADU





### Further steps of supply chain development for the 2018-2022 strategic cycle

