

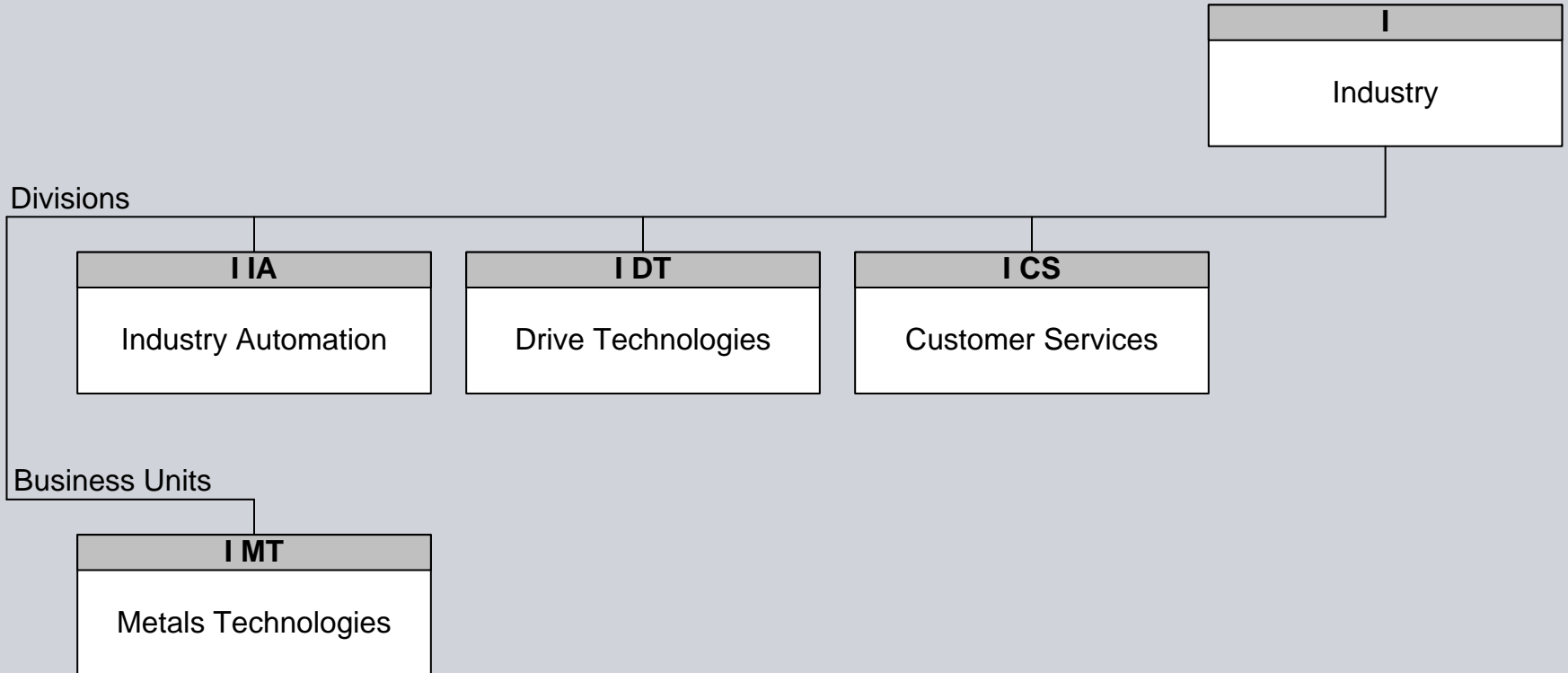
Steel plant simulation

Siemens VAI's Steel Library OSIRIS

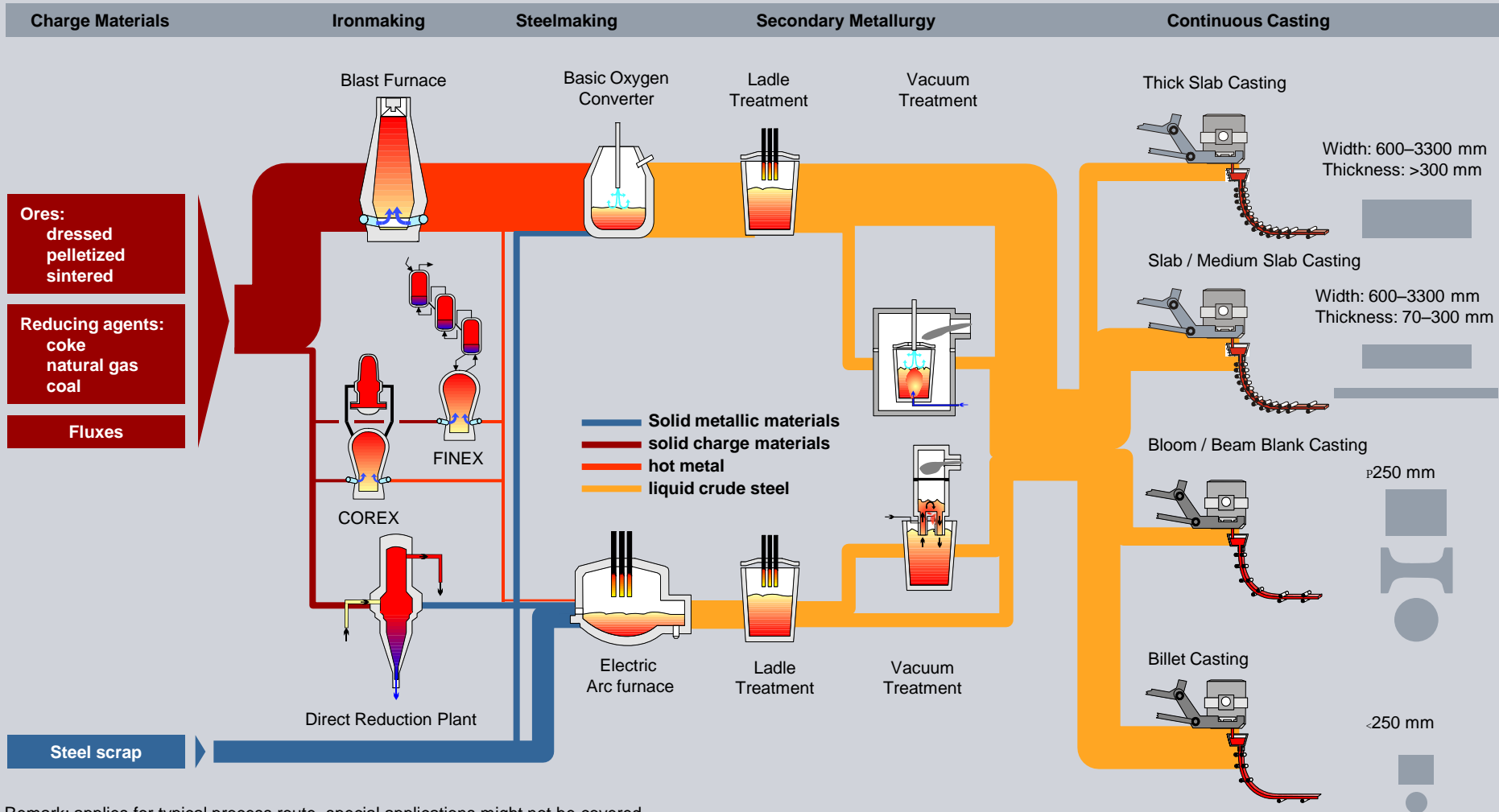
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Introduction

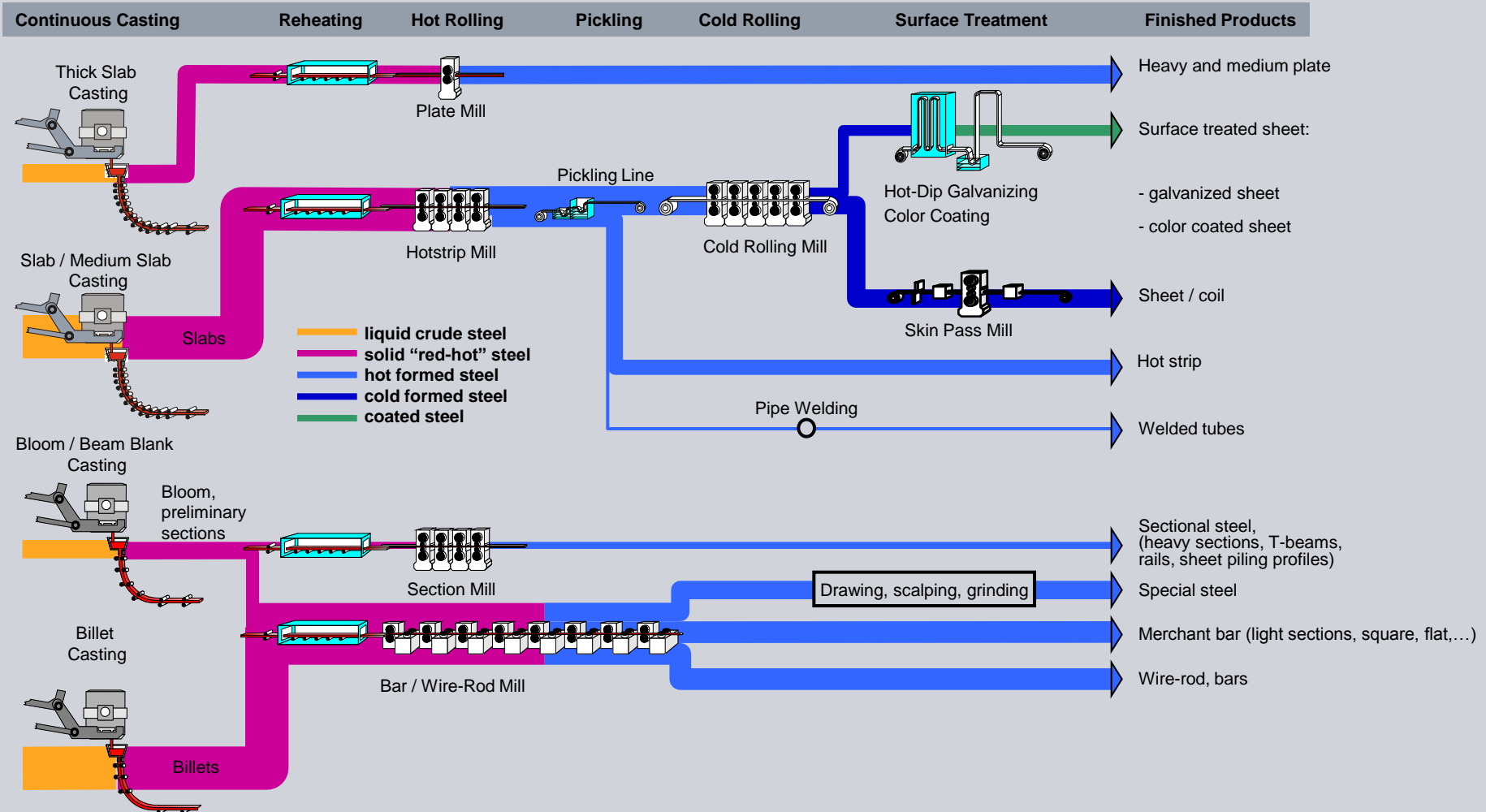


From Ore to Steel (1/2)

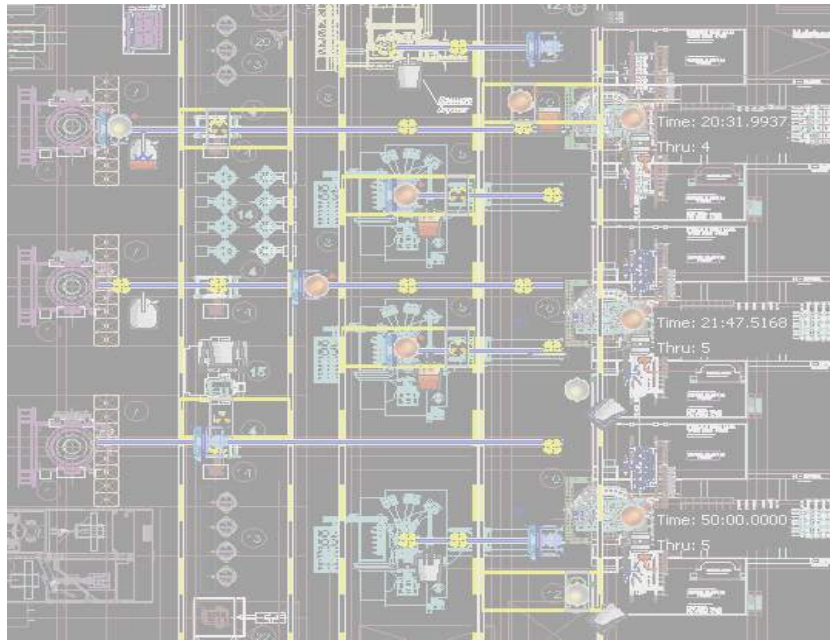


Remark: applies for typical process route, special applications might not be covered

From Ore to Steel (2/2)



Actual situation



Challenge

- Impact of transport system can not be calculated analytically
- Capacities of different aggregate groups have to be aligned
- Coordination within the plant
- Difficult to evaluate layout variants

Solution

- Use of metals specific industry library with decades of knowlegde
- Implements a realistic simulation model
- Conduct experiment using the model
- Provide complex scheduling algorithms
- Siemens standard simulation software

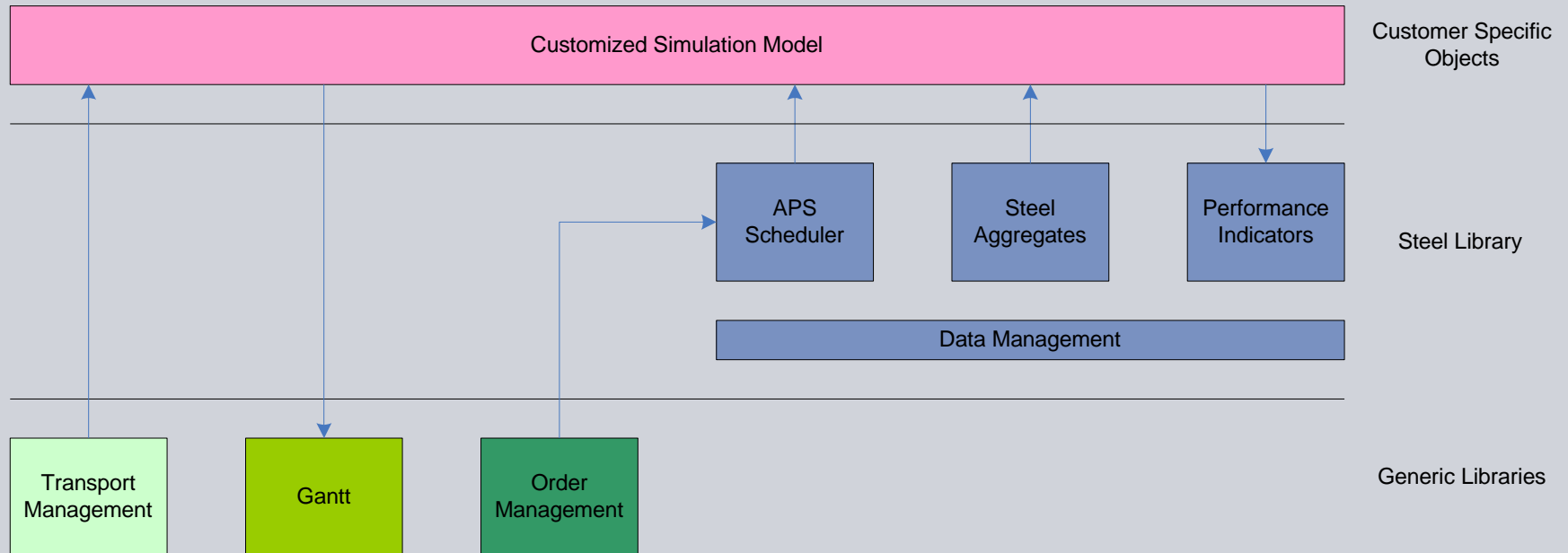
Environmental benefit

- Reduced consumption of electrical energy

Typical customer benefit

- Increase production
- Identify bottlenecks
- Reduce lead times
- Decrease of setup operations
- Reduce refractory costs
- Optimize crane operations

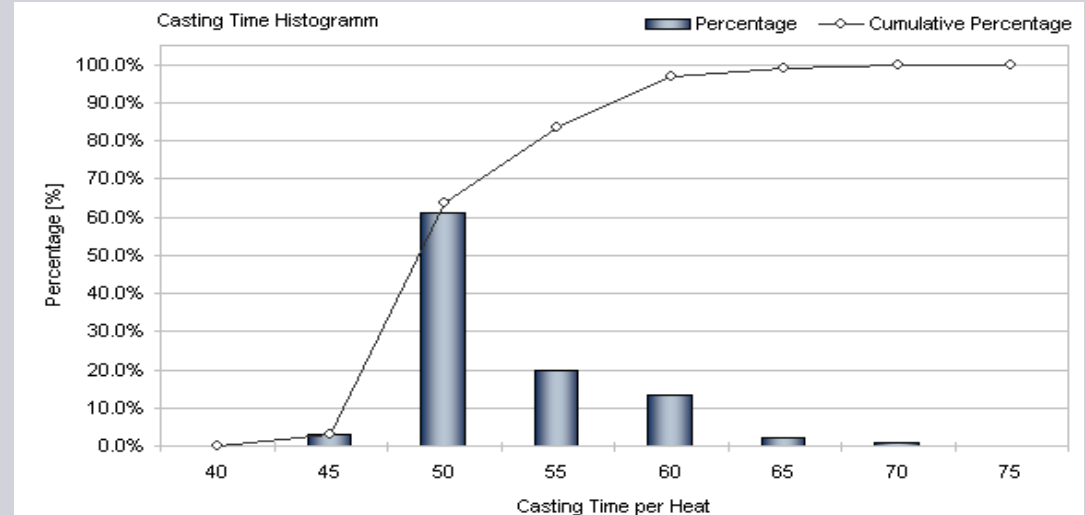
SVAI's steel library OSIRIS



- Steel specific library to model the material flows in a steel plant between melting aggregate and caster

Data management

- Definition of products, product routes and process parameters
- Predefined steel grades for standardized layouts available
- Flexible steel routes can be defined by using priority parameters
- Definition of several ladle cycles (hot metal, steel) is possible



Dialog

Name: MDM

Product: MBMLFRH3

Aggregate	Parameter	V
BOF5	procTime	2
BOF5	leadTime	3
BOF4	procTime	2
BOF4	leadTime	3
LF2A	procTime	1
LF2A	leadTime	2
LF2B	procTime	1
LF2B	leadTime	2
RH2	procTime	1

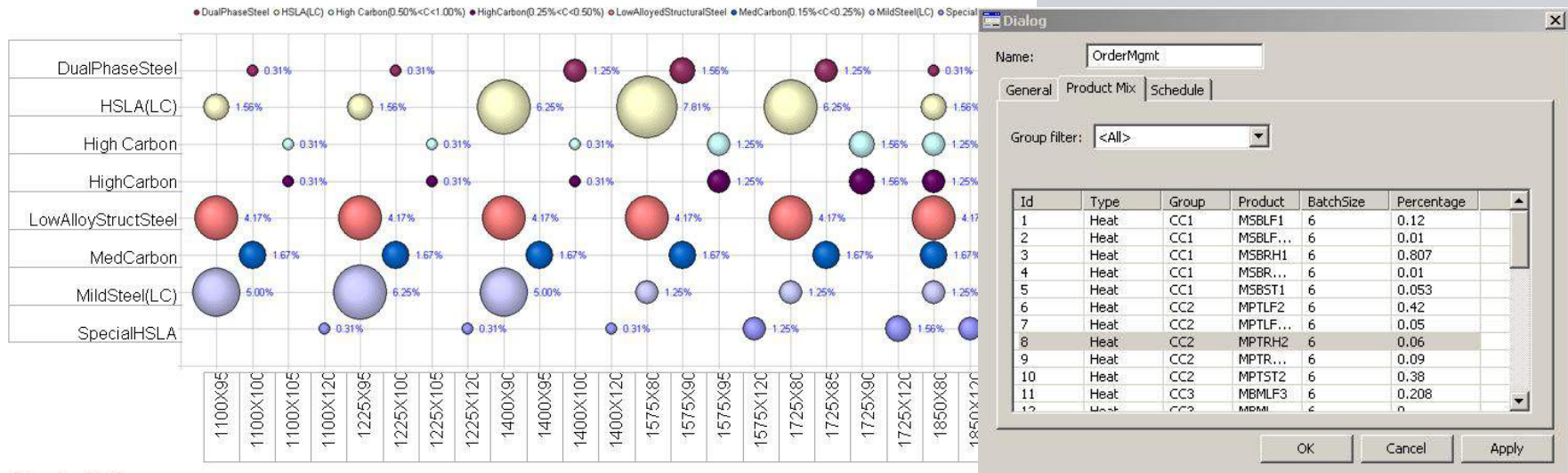
Dialog

Name: MDM

Product: MBTLFRH5

Aggregate	Successor	Priority
BOF5	LF2A	1
BOF5	LF2B	2
BOF4	LF2A	1
BOF4	LF2B	2
LF2A	RH2	1
LF2B	RH2	1
RH2	DEP5	1
DEP5	LTL5	1
LTL5	CCF	1

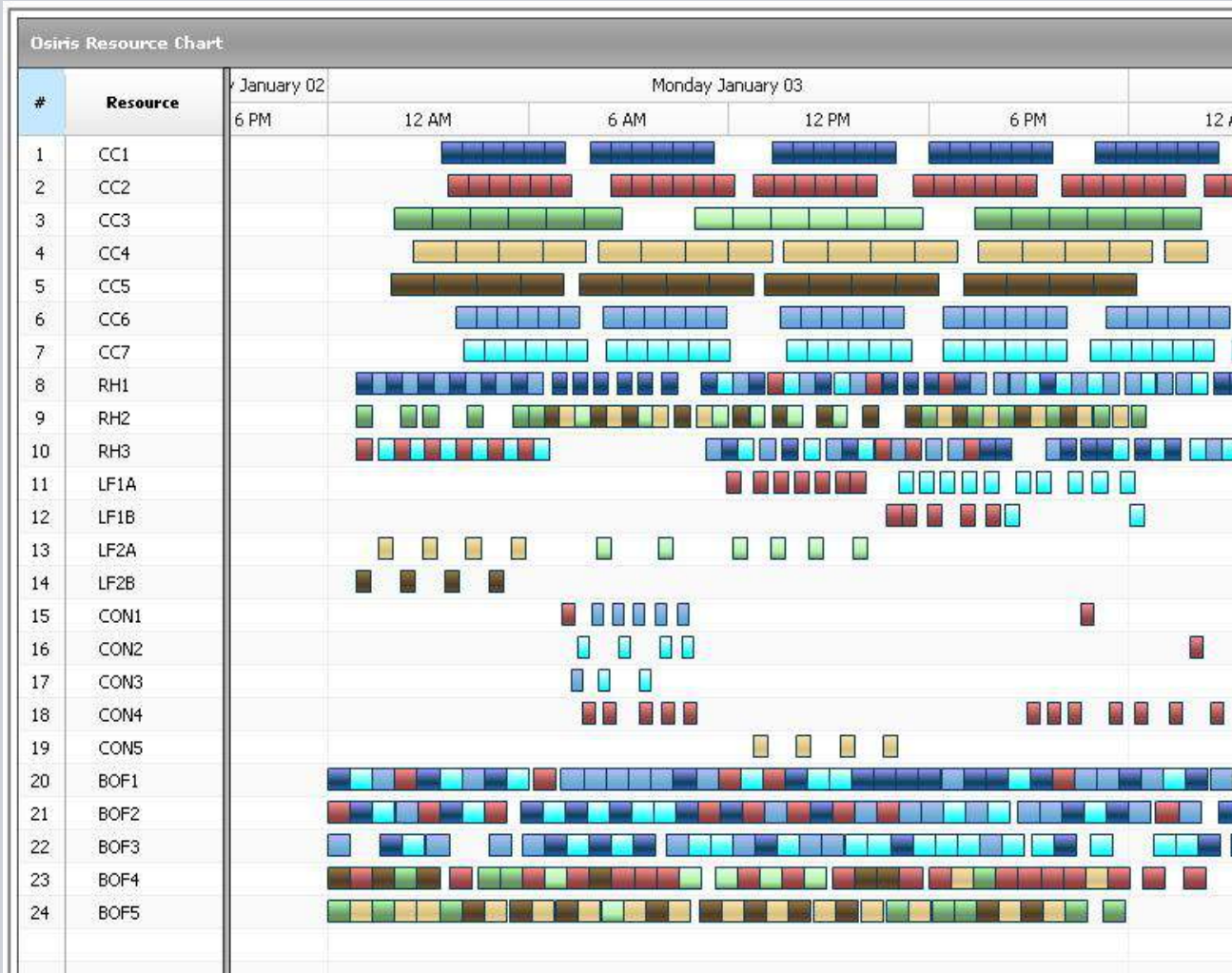
Order Management



Product Mix

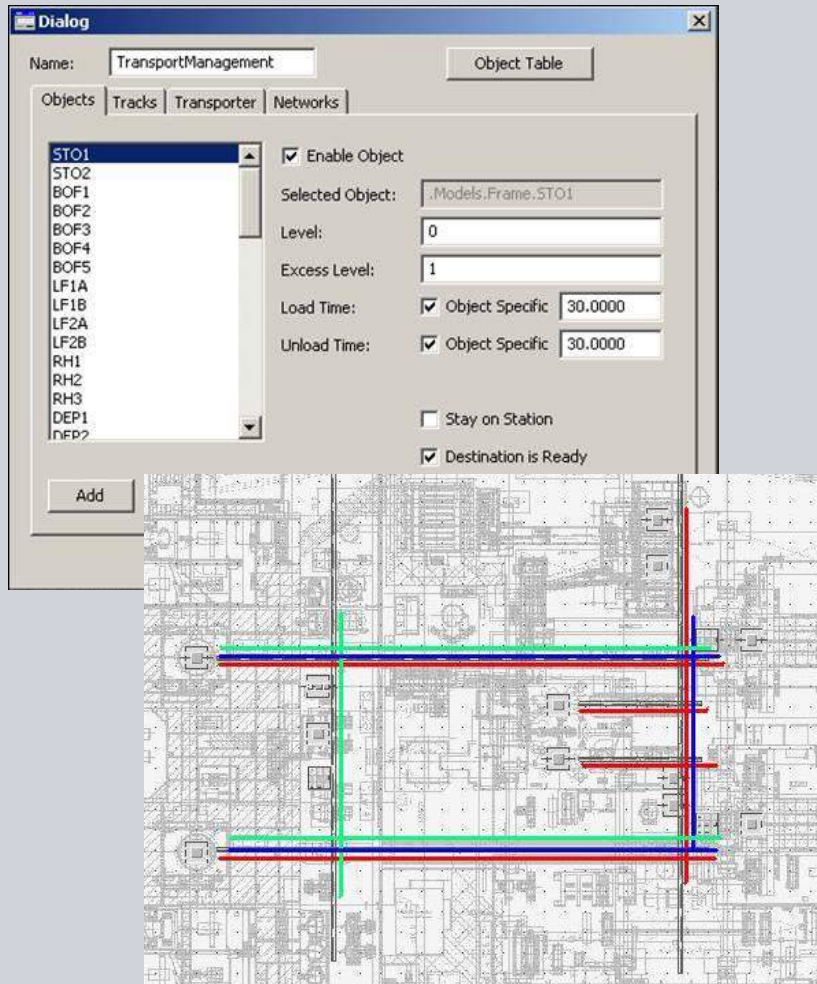
- Orders are created by using probability functions
- If a production orders are available these can be used instead of randomly created orders

APS Scheduler

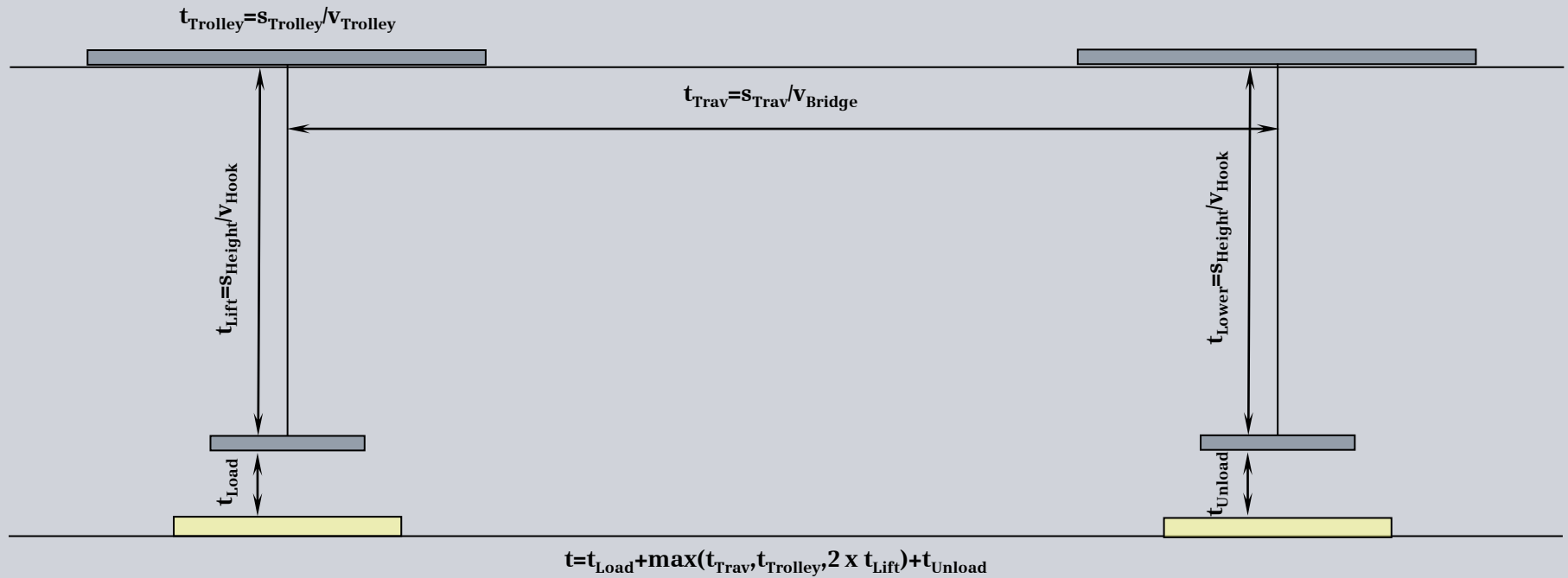


- Revise caster start times (sequence remains unchanged)
- Plan primary metallurgy aggregates
- Plan secondary metallurgy aggregates
- Plan sub-aggregates (conditioning stands, ...)

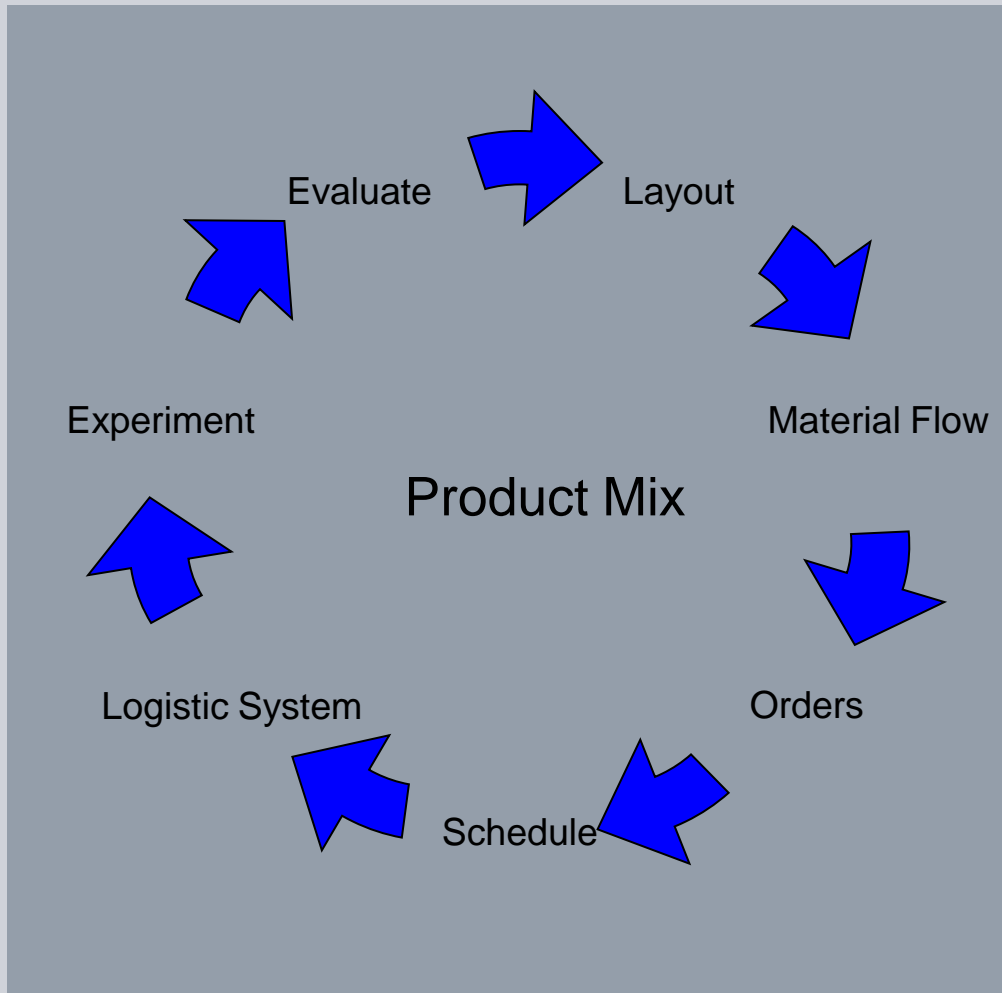
Transport Management



- Transport management is universally applicable
- Transport heights are defined for each aggregate/crane
- Transporters are created on basis of this object
- Network planning is used to restrict certain areas/transporters
- Intelligent collision control allows reliable crane transports
- Several strategies for crane dispatching are available

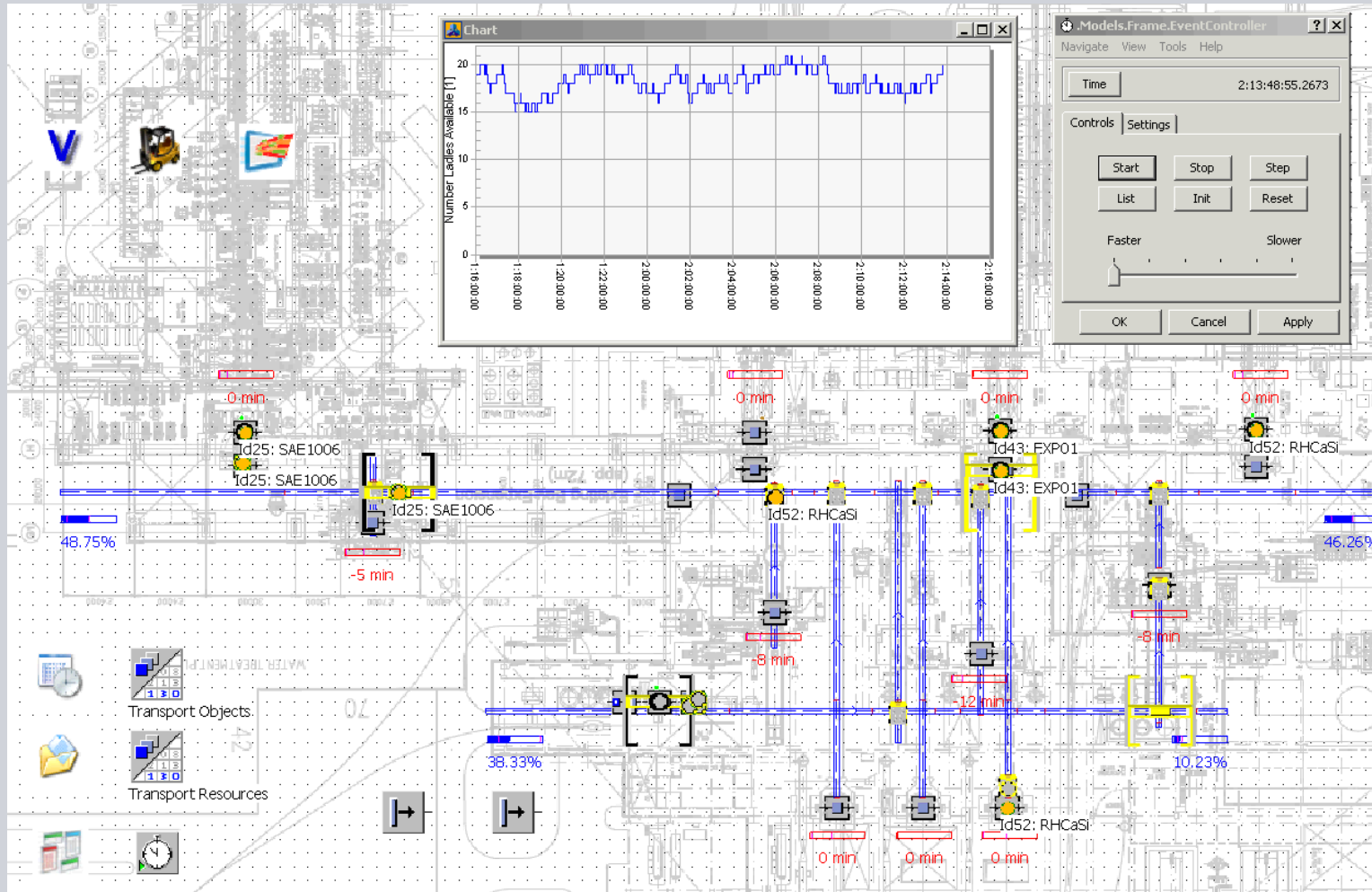


Methodology



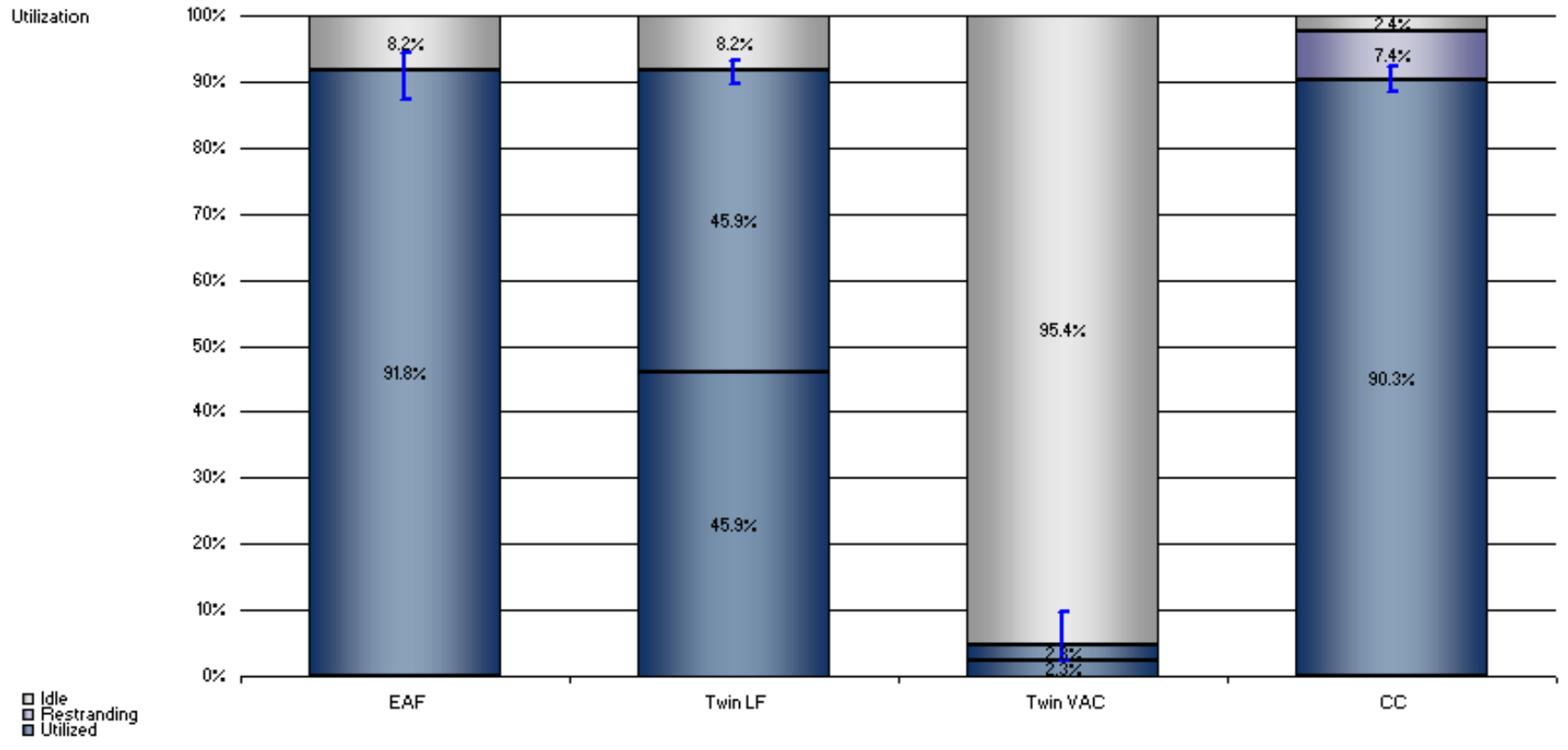
Example

Steel plant with 3 BOF, 4 CCM



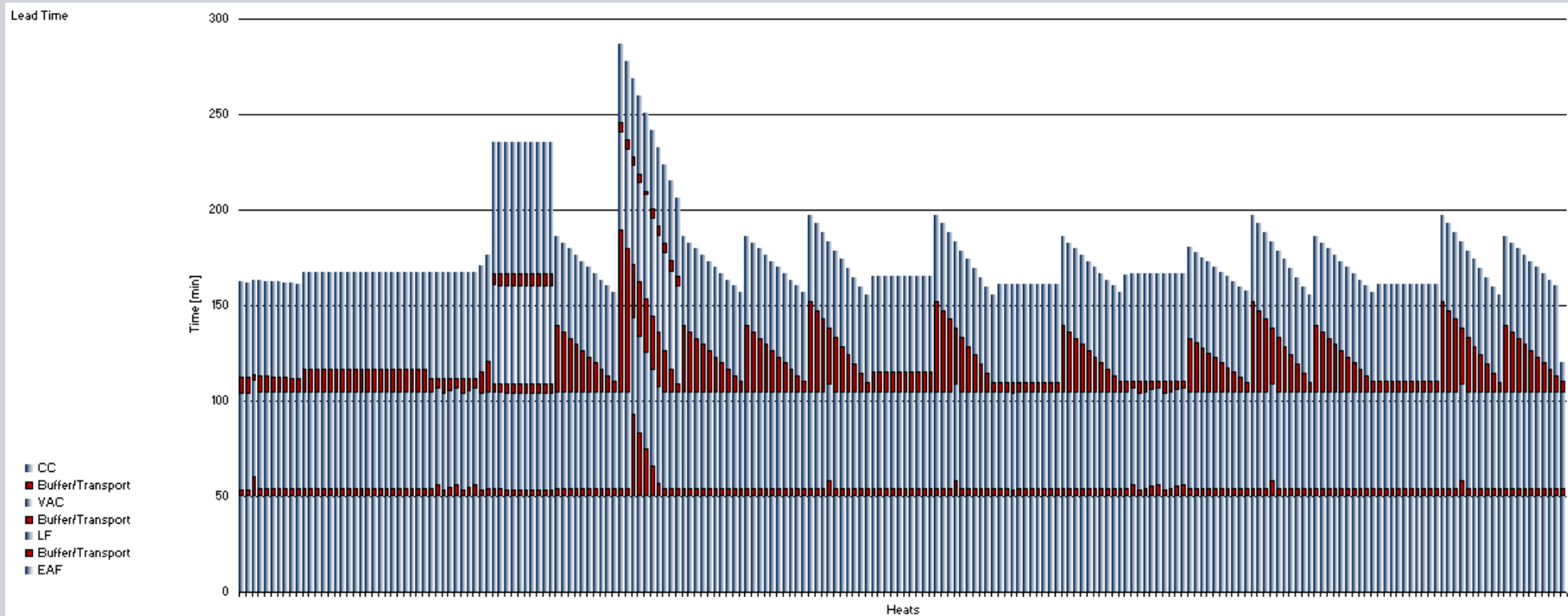
Results

Utilization of aggregates



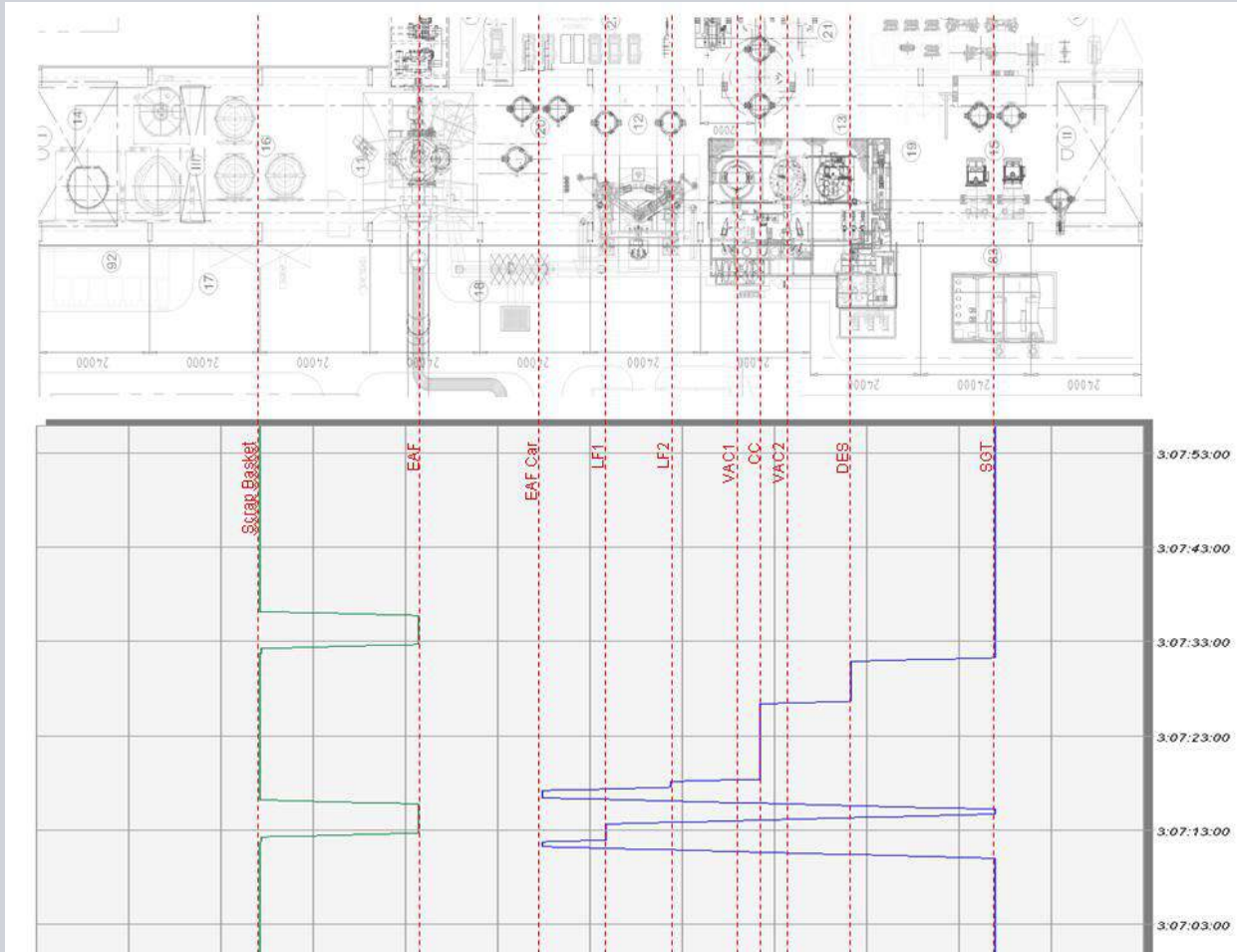
Results

Lead time vs buffer time

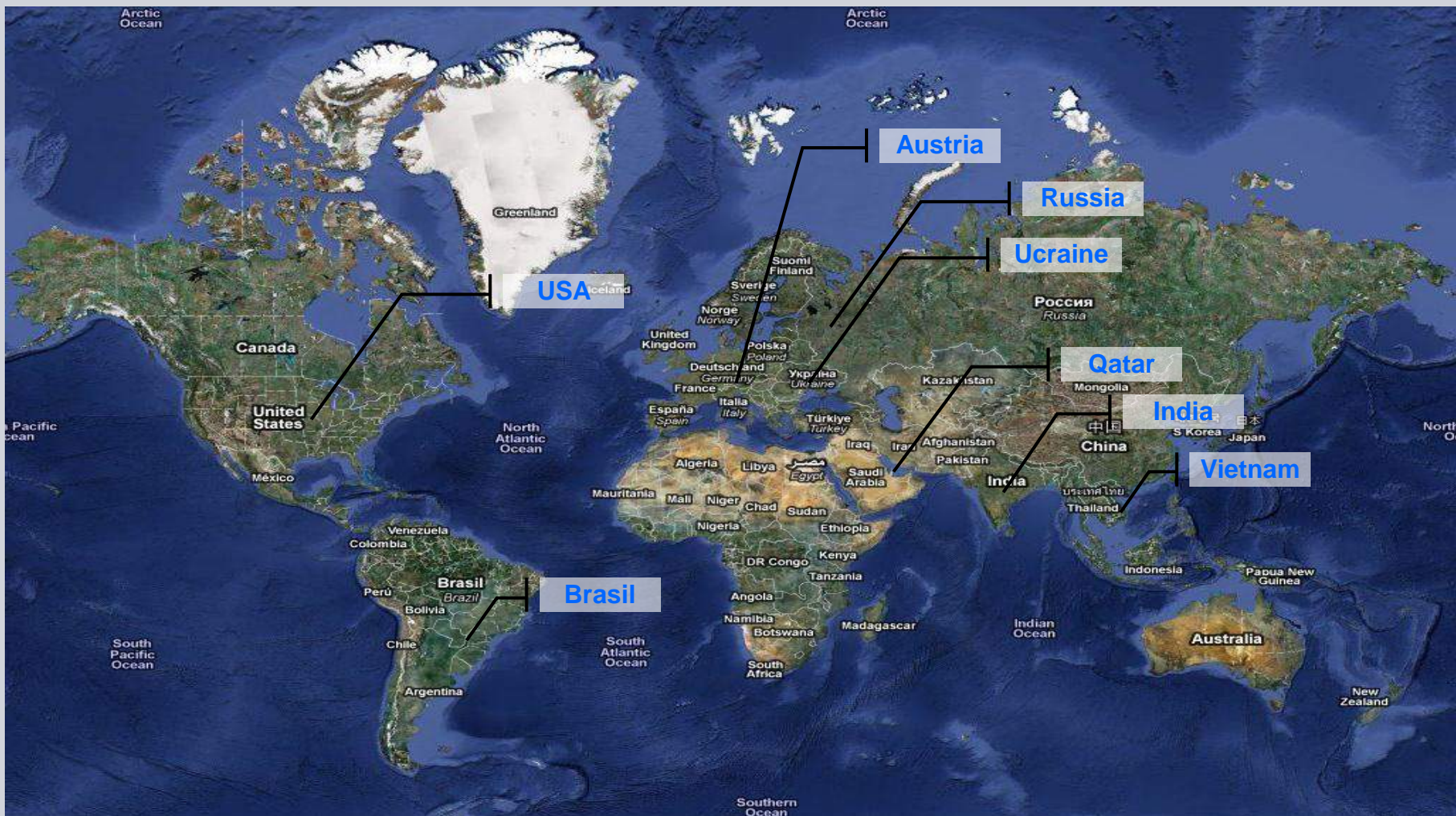


Results

Crane cycles



Recent References



Contact



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Thank you for your attention!

