dastur business
& technology consulting
A Division of M.N.Dastur & Company (P) Ltd

Simulation of Raw Material Unloading Yard (RMUY) for a large integrated steel plant

Case viewpoint:

Objectives: DBTC was engaged to review the capability and adequacy of the RMUY with the existing facilities as well as with the proposed additional facilities of 1 track hopper and 3 wagon tipplers. DBTC decided to develop a simulation model which would help The Steel Plant to make better informed decisions involving minimum costs. Objectives included:

- Determining the rake turnaround times for major raw materials
- Determining the Steel Plant loco fleet requirement and utilization
- Analysis of utilization of current vis-a-vis proposed facilities

Solution**:** A discrete event system simulation model was developed for the purpose of evaluating the existing system as well as vetting the proposed system. Two models were developed for the scenarios – One with the as-is facilities and the other with the proposed facilities of 1 track hopper and 3 wagon tipplers and the results were compared.

Scenario 1: System with additional facilities of 1 track hopper and 3 wagon tipplers for unloading of raw materials

Scenario 2: Current system

a) Comparison of material unloaded at the unloading facilities for the two scenarios

Material	Rakes	Tons
Coke(Coke Tippler)	940	2218400
Coal(New Coal Tippler1)	917	3516695
Coal(New Coal Tippler2)	535	2051725
CP Limestone(New CP Tippler)	530	2095090
SP Limestone(BBSP Tippler)	267	1055451
Iron ore fine -sinter(Track Hopper1)	722	2854066
Iron ore lump(Track Hopper2)	883	3490499
Iron ore fine -sinter(Track Hopper3)	1112	4395736
Iron ore fine-pellet (Track Hopper4)	1708	6751724

Scenario 1

Material	Rakes	Tons
Coke(Coke Tippler)	576	1359360
PCI Coal(PH3)	308	1181180
Coking Coal(CP1+RMH1+RMH2)	656	2669160
CP Limestone(LCP Tippler)	458	1968594
SP Limestone(BBSP Tippler)	239	944767
Iron ore fine (Track Hopper1)	1656	6704288
Iron ore lump(Track Hopper2)	867	3427251
Iron ore fine (Track Hopper3)	1858	7344674

Scenario 2

Material	% in move logic	% waiting	% in operation
Iron ore lump	11.79	18.17	70.03
Iron ore fine	16.46	34.69	48.85
Coal	7.75	17.23	75.02
Limestone	6.06	47.11	46.82
Coke	9.87	46.54	43.59

Scenario 1

Material	% in move logic	% waiting	% in operation
Iron ore lump	5.28	62.97	31.68
Iron ore fine	5.07	77.94	16.94
Limestone	0.25	97.31	2.43
Coke	0.05	99.75	0.2
Coal PCI	7.55	44.94	47.5
Coal Coking	9.13	24.69	66.18
Coal Coking	8.07	25.04	66.89

Scenario 2

It was found, that the quantity of material unloaded in scenario 2 is less than the material that would be required for the production expansion. The analysis helped in establishing the insufficiency of the current system to handle the increased inbound rakes.

Results: The two scenarios were built and the comparative analysis showed the following

- The additional facilities of 1 track hopper and 3 wagon tipplers for unloading of raw materials was a necessity
- Limitations, bottlenecks and congestions with the current as-is facilities is high
- Sufficiency of proposed facilities for handling further production expansion