

TMS MES in quarry

Description

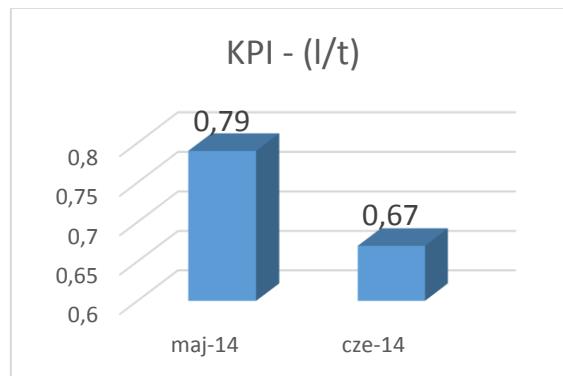
In 2008 TMS Standard system has been introduced in key mobile equipment in all 14 plants of a mining company located in Poland.

In 2014 TMS MES (Manufacturing Execution System) has been implemented in all conveyor scales in 14 gravel mines and quarries in Poland.

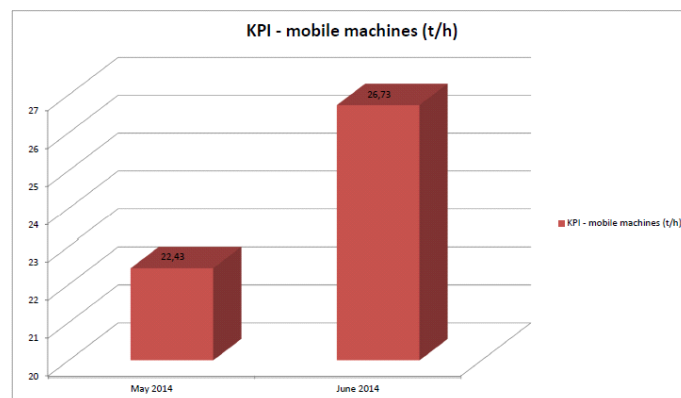
TMS delivered: reporting software, system configuration and personalization, e-mail alarms system, dedicated reports individually configured for each plant and automatically sent by e-mail to defined users.

Savings achieved in the query in 2014:

Optimization actions has been taken in June 2014.



As a result, fuel consumption in L/t has been reduced by 15%.



KPI - site dumpers output capacity (t/h)

Site dumpers output capacity in t/h increased by 19%.

Main benefits:

1. Increase of drives performed by the site dumpers and increase of daily production.
2. Increase of loading the site dumpers fully and increase of number of technological cycles during a work day.
3. Monitoring and comparing site dumpers loading in relation to the readings of conveyor scales.
4. Increase of efficient production time.

Key characteristics of the TMS MES used in quarry:

- **Reports tailored to individual needs of each mine manager**
- Daily and automatic reports distribution by e-mails: immediate information = comfortable usage and quick decision making = immediate improvements = **reduction of direct production costs per ton**
- **Optimal site dumpers usage and allocation** – due to automatic measurement of drives performed towards the crusher
- **Bottlenecks monitoring** through the technological cycle time control divided into drive, loading and reloading
- **Higher output capacity** due to a regular production measurement and monitoring and reduction of the output capacity fluctuation during one shift
- **Further output capacity improvement by a quick identification of disturbances and their reasons** (disturbances associated with the production plant, site dumpers standstills, digger standstills, managing all the production chain)
- **Reduction of the direct production costs through optimal resources allocation** (a adequate number of site dumpers for each plant)
- **Controlling the production discards** through comparing the performed production with drives performed by the site dumpers.
- **Better costs control** through:
 - Control of fuel consumption for each site dumper
 - Automatic KPI measurement in l/t
 - Automatic OEE measurement
- **Increased safety** and drivers behaviour

Methodology of using dedicated reports:

Process of using dedicated reports to improve plant's performance is continuous.


Mine manager:

- Compares drives performed by the site dumpers with the daily production.
 - Verifies the output capacity and KPIs in TMS reports daily and analyses reasons of decrease in output capacity and production disturbances by the use of "Day View" analytical report
 - Uses the "Day View" report to compare the regularity of unloading the site dumpers with the production plant output capacity and digger output capacity
 - Discusses the "Day View" report on the morning briefing.
- Regional manager:
- Discusses the reports on weekly meeting of mine managers.

Examples:

- Production report – verification of production plant utilization

Production report



Date	Shift	Time from	Time to	Nominal time	Total work time	Effective work time	Empty running time	KPI total time/empty run%	KPI total time/effective work time%	Production [T]	Efficiency [T/h]
2015-09-01				464:00	256:19	252:52	03:27	1.35%	54.50%	52397.90	207.22
	I	06:00	13:59	16:00	12:33	12:15	00:18	2.39%	76.56%	2213.50	180.69
	II	14:00	21:59	08:00	06:03	05:50	00:13	3.58%	72.92%	1045.60	179.25
2015-09-02				464:00	256:19	252:52	03:27	1.35%	54.50%	52397.90	207.22
	I	06:00	13:59	16:00	12:33	12:15	00:18	2.39%	76.56%	2213.50	180.69
	II	14:00	21:59	08:00	06:03	05:50	00:13	3.58%	72.92%	1045.60	179.25
2015-09-03				464:00	256:19	252:52	03:27	1.35%	54.50%	52397.90	207.22
	I	06:00	13:59	16:00	12:33	12:15	00:18	2.39%	76.56%	2213.50	180.69
	II	14:00	21:59	08:00	06:03	05:50	00:13	3.58%	72.92%	1045.60	179.25
2015-09-04				464:00	256:19	252:52	03:27	1.35%	54.50%	52397.90	207.22
	I	06:00	13:59	16:00	12:33	12:15	00:18	2.39%	76.56%	2213.50	180.69
	II	14:00	21:59	08:00	06:03	05:50	00:13	3.58%	72.92%	1045.60	179.25

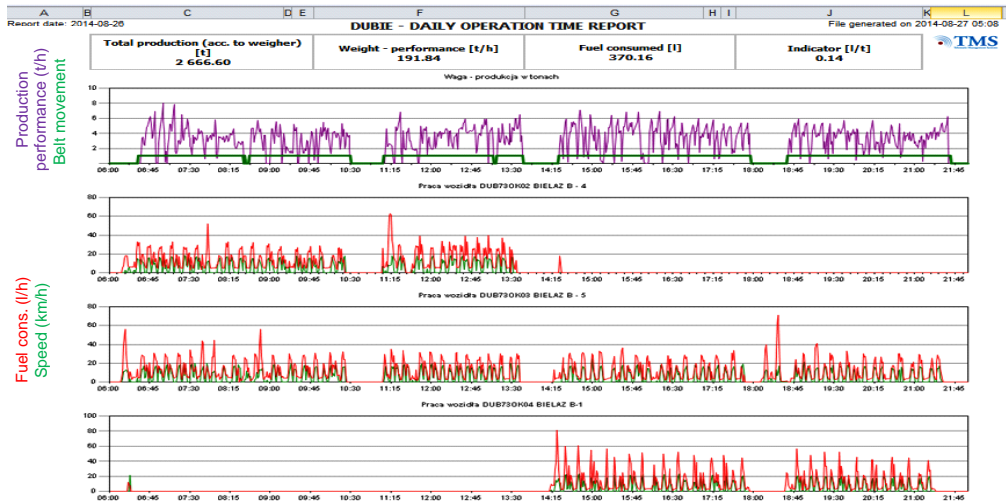
Production report, quarry, cover weight

- Unloading report – compares drives performed by the site dumpers with the daily production.

Dumppers summary report																
Month	Week	Day	Registration number	Shift	Time from	Time to	Number of unloadings	Nominal weight of material [T]	Operati on time	Downti mes	Idle time	Distance [km]	Uploadin gs per hour	Average course time	Fuel [l]	Fuel [l/T]
2014-09-01	36						1718	56372	588:51	1427:09	225:26	3 708,47	2,92	00:21	8491,28	0,15
2014-09-02							445	14468	151:12	352:48	56:18	1 022,24	2,94	00:20	2257,37	0,16
2014-09-03			DUB730K02				87	2878	26:28	45:32	10:11	181,09	3,29	00:18	381,35	0,13
2014-09-04			DUB730K03				83	2732	25:55	46:05	09:09	182,27	3,20	00:19	400,83	0,15
2014-09-05			DUB730K04				0	0	00:00	24:00	00:00	0,10	0,00	00:00	0,00	0,00
2014-09-06				I	06:00	13:59	21	546	06:37	01:23	02:06	46,63	3,17	00:19	95,14	0,17
2014-09-07				II	14:00	21:59	21	546	06:35	01:25	02:16	46,01	3,19	00:19	91,12	0,17
2014-09-08				III	22:00	05:59	0	0	00:00	08:00	00:00	0,00	0,00	00:00	0,00	0,00
2014-09-09				I	06:00	13:59	41	1640	12:43	11:17	04:47	89,52	3,22	00:19	214,58	0,13
2014-09-10				II	14:00	21:59	19	760	06:09	01:51	02:23	44,62	3,09	00:19	102,66	0,14
2014-09-11				III	22:00	05:59	0	0	00:01	07:59	00:00	0,00	0,00	00:00	0,16	0,00
2014-09-12							82	2454	25:59	46:01	07:43	183,89	3,16	00:19	390,16	0,16
2014-09-13							77	2548	31:44	40:16	13:24	194,26	2,43	00:25	439,38	0,17
2014-09-14							83	2732	25:43	46:17	10:31	175,98	3,23	00:19	366,06	0,13
2014-09-15							33	1124	15:23	56:37	05:20	104,76	2,15	00:28	279,60	0,25
2014-09-16							0	0	00:00	72:00	00:00	0,00	0,00	00:00	0,00	0,00
2014-09-17							389	12984	133:22	370:38	54:45	848,59	2,92	00:21	1847,01	0,14

Site dumpers report, quarry

- "Day View report" – reasons identification of worsen indicators



Daily work report, quarry