



Belt ID: Primary
TPH: 543
Downtime: 25 mins
Uptime: 82%

Loader ID: 915
Job#: 2140
Customer: TDC Co.
Material: Gap 20

Excavator ID: 521
Payload: 12.1 t
Material: Shotrock
Blast ID: 9235

Transforming the aggregates workflow

Trimble Aggregates

Transforming the Aggregates Workflow



Loader ID: L132

Job #:	41320
Customer:	RTT Co.
Material:	GAP20
Bucket:	6.12 t
Target:	34 t
Cycle time:	4 min 20 sec
Next job:	41323

Site summary

Site:	AB Quarries
Today's total:	12,917 t
TPH:	517
Uptime:	97%
Total aggregate:	124,882

GAP 40:	45,456 t
GAP 20:	34,524 t
Waste:	12,029 t

THE CONNECTED QUARRY

Trimble is committed to transforming how the world works. Our industry specific solutions integrate advanced capabilities and technologies, our dedicated expert support and domain expertise help customers tackle some of their greatest challenges. We understand the aggregates industry are committed to helping our customers successfully tackle priority issues such as:

- ▶ Pressure on product margins due to competition and increasingly tight specifications requested by customers
- ▶ Rising costs of production due to energy costs, maintenance costs, and environmental and health and safety regulatory compliance
- ▶ Limited access to capital to expand production capacity by purchasing additional equipment or limited ability
- ▶ to expand production through additional equipment purchases, due to capital investment restrictions

Trimble Aggregates solutions are built on the foundation of the Trimble's LOADRITE™ product range. LOADRITE™ products have been a world leader in productivity solutions and wheel loader scales since 1979. LOADRITE products allow monitoring of production and efficiency from the pit until the truck is loaded to go out the gate.

The overall benefit of Trimble Aggregate solutions is to enable customers to drive towards streamlined operations by reducing waste across their production process. The technology within each solution offers benefits at multiple levels across the aggregates production process.



Truck ID: PK513	
Job #:	41318
Customer:	TAK
Material:	Fines
Total:	48 t
Time on site:	12 min 29 sec

Time Cost

Profit Target

MULTI-LEVEL SOLUTIONS

Task productivity

Trimble technology equips staff to complete task in the wider workflow more efficiently and with better information for more informed decision-making. The benefits of this are:

- ▶ Faster and more accurate completion of tasks
- ▶ Enhanced operator safety and satisfaction
- ▶ Enhanced utilization of capital equipment capacity

Process productivity

Applying these technologies allows operations management to monitor and visualize production across the site(s) in real-time. More advanced process productivity technologies also provide a tight level of integration between hand-off points to facilitate information sharing and streamline processes. The benefits include:

- ▶ Visibility of progress against plans
- ▶ Timely asset and resource allocation decisions

- ▶ Improved data access, quality, analysis, measurement and outcomes

Continuous improvement

These tools provide historical visualization and analysis of information from multiple sources across the site(s). This allows management and process improvement teams to benchmark operational performance and then compare time periods, operators, assets and sites to identify cost drivers, revenue leaks and opportunities to control and sustain positive process changes.

The benefits of this are:

- ▶ Higher production, reduced costs, less waste creating better utilization of assets and operators
- ▶ Better long term planning decisions based on hard data
- ▶ Enhanced visibility of the impact and effectiveness of process changes

Connected Aggregates Workflow



Aggregate supply chains around the world trust Trimble to improve productivity and efficiency. Using Trimble technology provides a clear picture of quarry operations as materials and productivity are tracked from pit, to processing and then loadout.

HOW TRIMBLE TRANSFORMS THE AGGREGATES WORKFLOW

Extraction

- ▶ Load correctly starting right from the pit
- ▶ Manage your blasting performance and eliminate the guesswork involved haul truck loading
- ▶ Quickly identify opportunities for improvement in loading, cycle times, equipment utilization and maintenance

Processing

- ▶ Increase the profitability of your operations by monitoring and improving your crushing and screening
- ▶ Measure production from crushers and screens, monitors throughput on conveyor belts to calculate stockpile tonnage

Loadout

- ▶ Measure and improve loader efficiency, performance, truck cycle times and customer satisfaction
- ▶ Track materials leaving your site, and load every truck safely, quickly and accurately
- ▶ Use loader scales optimize truck loadout, and generate billable information and tickets straight from the loader scale (where available).



LOADRITE is a leader in the field of payload weighing and measurement since 1979. Now LOADRITE is part of the Trimble portfolio of site wide productivity solutions, to ensure optimal loading and quality data for productivity analysis on your wheel loaders, excavators, conveyor belts and other equipment.

Trimble aggregates

Trimble offers technology that adds value to aggregates business. The range of point solutions, help operators achieve their goals and collect data for 'Connected Site' solutions to improve operations by centralizing, comparing and summarizing valuable information. Group managers, site managers, supervisors and operators can view and share relevant data for monitoring or analysis, as required.

Trimble connects the workflow of aggregates from the pit to the final constructed product and multiple work processes within each phase. In quarry, fleet or construction, Trimble

solutions are used throughout the process to improve productivity, reduce waste and re-work, and enable decision making through better awareness, data flow and collaboration.

The Trimble portfolio of products and solutions contribute significantly to the ROI of aggregates and construction operations by increasing productivity, lowering operational costs, improving quality, enhancing safety and compliance and reducing environmental impact.

How Trimble Optimizes the Extraction Workflow



Excavator ID: 2413
Bucket: 9.1 t
Shift total: 784 t
Loading time: 91%

Bucket ID: 524
Payload: 6.4 t
Material: Shot rock
Location: GS quarry



Pit loading and haulage

A good loader operator can optimize the loadout process, equipped with scales the operator can load to within a couple hundred pounds of the truck's load limit. This prevents load-adjustment, dumping excess, or turn-arounds that cost money and time. For new or unskilled operators scales help them to perform to required standards. Scales also help reduce truck cycle times, track production to targets, extend truck life, monitor drivers and address poor driving practices.

Haul truck monitoring

Counting and recording haul truck cycles is a tedious and error-prone exercise that few operators enjoy. Fleet managers also welcome any steps that remove workload from haul truck operators to allow them to focus on safe and productive material movement. For data-entry operators, the interpretation and alignment of paper-based tally sheets can be a complex and frustrating activity, so the arrival of the new haul truck monitor from Trimble, signals a welcome relief from these issues. Trimble onboard scales also help to measure and report blasting contractor performance to provide feedback and improve future blasts.



Blast ID: SB866	
Face:	Lower Blue
Total tonnage:	12,582 t
% Oversize:	7.4%



Haul truck speeding

Speeding contributes to a range of productivity, safety and maintenance issues. Trimble has powerful tools to help the driver see when the truck is operating outside of normal operating parameters. Haul truck monitor can provide speeding, roll-over, tray-up, idle time, carry back and overloading alerts. This enables the operator to react to undesired truck operation before a problem occurs and in the most part, without the need for manager intervention. Customers have reported an 80% reduction in total speeding events with serious events reduced to near zero.



Excavator ID: 2413	
Excavator ID:	2413
Bucket:	7.1 t
Shift total:	784 t
Loading time:	91%

Improve Processing Efficiency

Belt ID: CV4

Daily target:	900 t
Daily total:	773 t
TPH:	145
Run time:	5 hr 35 mins
Downtime:	0 hr 15 mins
Uptime %:	96%

Belt ID: Secondary

Daily target:	2,500 t
Daily total:	2,256 t
TPH:	243
Run time:	10 hr 32 mins
Downtime:	1 hr 15 mins
Uptime %:	88%

Belt ID: Primary

Daily target:	5,200 t
Daily total:	4,817 t
TPH:	517
Run time:	10 hr 42 mins
Downtime:	1 hr 23 mins
Uptime %:	87%
KWh:	3,427

Site summary

Site:	AB Quarries
Today's total:	4,967 t
Today's target:	5,200 t
TPH:	521
Uptime:	86%
Downtime:	1 hr 33 mins



Production reporting

Trimble provides accurate and reliable visibility of quarry operations performance. A belt scale after your primary crusher and final product belts allow you track tons per hour, total tonnage, average tons per hour, start time and stop time.

Plant performance

With scales on every belt, you can see every bottleneck, track every product, and know exactly what every part of your plant is doing. Measuring weight, downtime and performance of multiple belts will allow you to track the actual optimal mode mix when planning production to meet sales forecasts.

- ▶ Track throughput of primary, secondary, and tertiary crushing
- ▶ See the effectiveness of your screen decks and wash plants
- ▶ Report inventory levels, optimizing your modes to manufacture the most profitable product mix

Downtime reporting

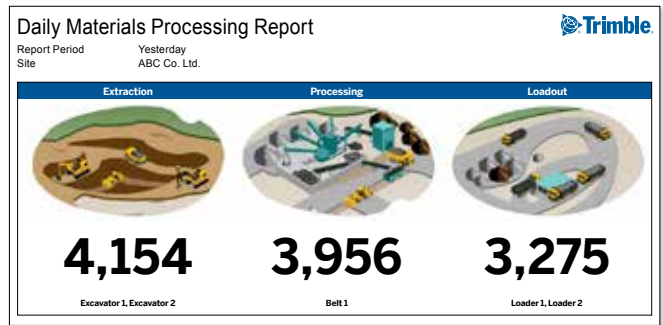
See downtime issues and gaps between expected production and actual production during the shift. Simple and functional reports via printer, email or a web browser on your smart phone or PC provides operations visibility wherever you are. Trimble also measures time spent running empty or partially loaded.

Stockpile management

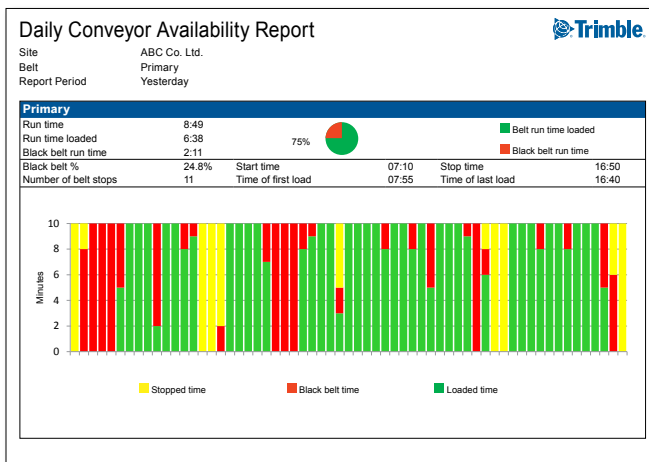
Stockpile estimation can be difficult with different degrees of accuracy. With belt scales, managers can keep running inventory totals of crucial products. Instead of measuring at the end of each quarter, the quarry manager can have a fair estimate of inventory, and avoid stock write-offs.



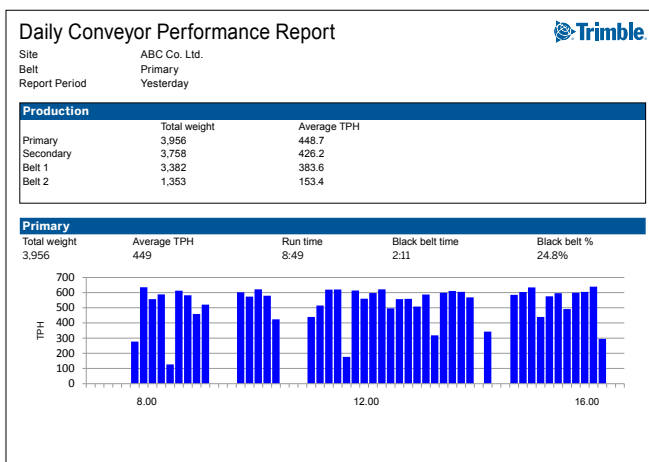
SITE MANAGER: Maintain a live feed across your plant, to act during the shift.



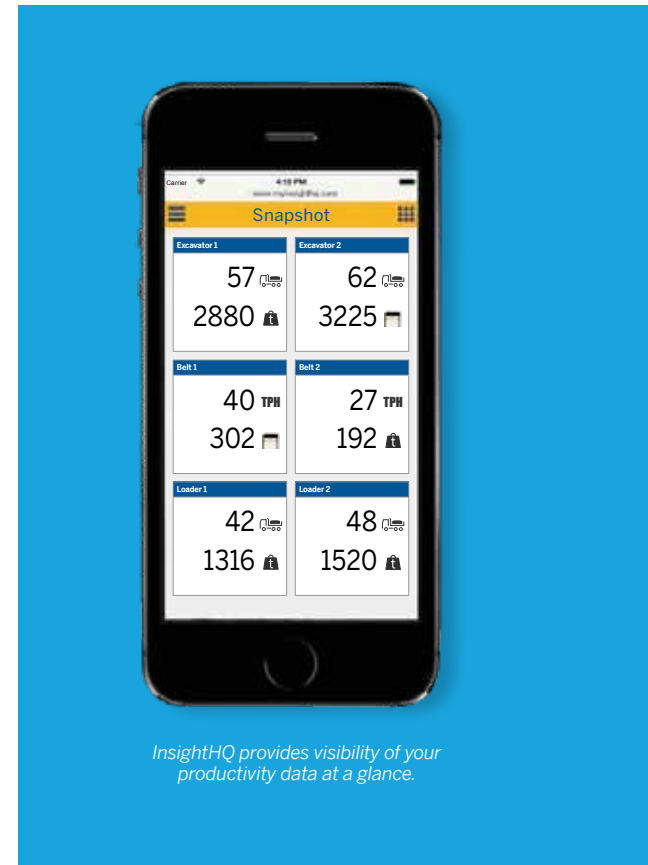
Connect the flow throughout your quarry.



QUARRY MANAGER: View downtime issues and compare expected and actual production, during the shift.



REGIONAL MANAGER: Monitor quarry performance via reports or on a mobile device.



InsightHQ provides visibility of your productivity data at a glance.

Trimble Improves Loadout Speed and Accuracy



The loadout area is where product turns to revenue, so it is important to get paid for every tonne of material and keep efficient operations.

Accurate, repeatable loadout

Inexperienced loader or truck operators can impact loadout and haulage by as much as 15 to 30%. But a good loader operator can speed up the loadout process, and equipped with scales the operator can load to within a couple hundred pounds of the truck's load limit.

By highlighting skill gaps and resolving via a training program, bottlenecks are solved. The resulting improved waiting and loading cycle times have an immediate effect on the operation's ability to meet targets and improve customer satisfaction. Overloading can lead to unnecessary expenses, prosecution or more serious investigation (depending on local legislation). Ensure compliance and prevent overload fines by correctly loading every truck right the first time. Accurate loadout also prevent tip-offs and turn-arounds after the scale house that introduce inefficiency and costs into operations.

Machine optimization

Matching equipment and bucket sizes for efficient loading takes experimentation and consultation, but having accurate data makes decision-making much easier. By following a trail of data, quarry managers can clearly evaluate and present process improvement changes. Investigate process bottlenecks by drilling down into detailed operations data.

Rail/barge loadout

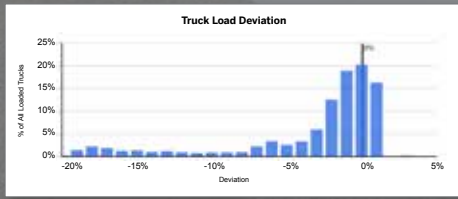
Track loading efficiency to keep barges and ships on schedule while in port. For rail loadout, Trimble payload measurement systems help maintain consistent rail car payload for uniform unloading. By tracking inventory as it is loaded it's easier to deliver the right inventory at the right time.

Analysis and improvement

By collecting the production data via scales, and using preformatted graphs and reports the quarry manager can compare, examine and highlight improvements. Easy to create reports also make it easier to share feedback with the team to foster improvement culture. Reduce communication ambiguity by automated in-cab job lists. Now every truck is



1



3

Report Period: Today (3/10/2015)

Truck	Product	Zone	Machine	Time In	Time Out	Weight Requested	Weight Loaded	Weight Bridge
CEN42	GC148	Concrete	5803	3/10/2015 5:58:00 AM	6:09:45 AM	26,040	24,740	25,740
ROCK1	PAP7	Concrete	5803	3/10/2015 6:02:00 AM	6:12:56 AM	27,920	26,220	27,280
AWASS1	TURCHIPP5	Causeway	5804	3/10/2015 6:03:00 AM	6:15:13 AM	29,280	26,000	26,860
ROCK19	GC107	Causeway	5803	3/10/2015 6:04:00 AM	6:17:19 AM	36,830	34,940	36,240
ROCK18	GCC25	Causeway	5804	3/10/2015 6:07:00 AM	6:26:12 AM	36,850	0.000	36,600
FRD211	WASH	Concrete	5804	3/10/2015 6:12:00 AM	6:28:35 AM	26,640	25,150	25,400
ROCK20	GC148	Concrete	5803	3/10/2015 6:12:00 AM	6:30:02 AM	36,770	36,220	37,100
ETE180	DRAIN25	Skyline	5804	3/10/2015 6:18:00 AM	6:31:41 AM	12,660	10,050	10,180
ROCK55	GC148	Concrete	5803	3/10/2015 6:15:00 AM	6:34:17 AM	34,530	32,860	33,500
ROCK33	PAP14	Skyline	5804	3/10/2015 6:17:00 AM	6:36:58 AM	27,460	26,600	26,820
ROCK59	GC148	Concrete	5804	3/10/2015 6:34:00 AM	6:45:49 AM	34,620	26,500	27,000
HQB242	GAPHFB	Upper	5803	3/10/2015 6:35:00 AM	6:47:06 AM	27,460	26,440	26,960
HHY262	GAPHFB	Upper	5803	3/10/2015 6:36:00 AM	6:49:47 AM	27,560	26,980	27,340

2



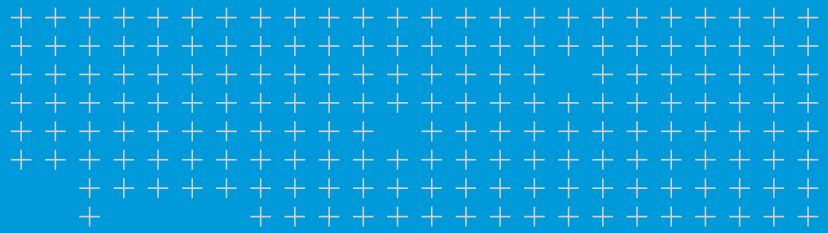
presented with clear job information, and without the need for communications chatter.

Loadout management solutions

The loadout zone can get busy, so prioritizing and meeting customer demand becomes easier with the right information delivered to operators. Delivering the right product, to the right customer becomes easier with a loadout management tool for the loader operator and scalehouse. By providing near real-time customer job lists the loader operator can be empowered with a sense of urgency and priority across the site. The technology also reduces verbal communication, errors and enables a reduction in truck waiting time. By tracking loader performance, TPH of the site, time spent loading on activities, fleet managers can highlight efficient loader operators, or staff training needs. Trimble offers connected quarry solutions that can improve loadout operation through performance metric tracking, job data automation, and real-time 360° job visibility.

CASE STUDY – BLYTHE DALE, CANADA

Blythe Dale were looking at ways to increase opportunities for new contracts and work. Investigating options which would allow them to offer certified scale readings led them to weigh bridges that cost around USD\$60,000 to install. Instead, the solution came in the form of the LOADRITE L2180 wheel loader scale. This meant weights recorded by loaders were accepted in place of the traditional and expensive weigh stations. Being certified Legal for Trade enables them to gain a competitive advantage in tendering bids.



Trimble: Transforming the Way the World Works

Trimble provides the tools and support for the extraction, processing, loadout, distribution phases of quarry production information for more efficient operations and higher profits. Contact your local dealer today to learn how easy it is to utilize technology that makes significant improvements to the aggregates workflow, optimize production, improve efficiency and lower your operating costs.



CONTACT YOUR TRIMBLE MINING DEALER TODAY

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