

# Smart Quarry Site Your fleet management solution



#### **ROI - Your Return**

Increase quarry and construction productivity
Increase fuel efficiency and reduce fuel burn
Monitor and improve site safety
Reduce overall site emissions
Manage utilisation and reduce unnecessary idling
Average ROI within 12 months

#### Do More - Save Money

Understand exactly what your fleet is doing and when to make decisions to optimise fleet efficiency
Ongoing real time overview of every connected machine movement and machine condition
Save time with automated data collection
Improve accuracy of data by eliminating human error
Improve operations from real-time operator scorecards
Automated operation requiring minimal interaction by operators

#### **Smart Quarry Site Product Summary**

Smart Quarry Site is a fleet management solution for quarry and large construction sites Simple in-cab automated operation and display Sophisticated in office real-time site monitoring Real-time data aggregation visualised and usable Selection of industry leading dashboards – built with voice of the industry in mind Electronic PreStart checks plus auto-reporting Supports agnostic OEM fleet over most construction and mining sized machines

# **Smart Quarry Site**

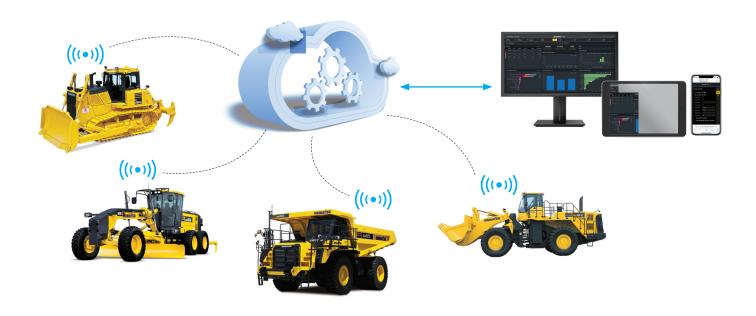


# Smart Quarry Site is an all-makes Fleet Management Solution tailored for the global market. It is designed to optimise operations in six critical areas:

- Site management
- Production
- Machine health
- Effective utilisation
- Maintenance
- Safety for guarry operations and large civil construction projects



Through the Smart Quarry Site offering, site management can access an intuitive and informative fleet management visualisation suite of products. Smart Quarry Site provides a close to real-time animated overview of all production machines and their activities, including material extraction, movement, and specific dump locations tracked by circuit, material and machine. Specifically catered to various equipment types such as trucks, loaders, excavators, graders, and dozers, Smart Quarry Site empowers businesses to streamline workflows and improve productivity in quarry and construction projects. Additionally, it enhances safety measures, ensuring smoother and more efficient operations throughout business.



# Safety and PreStart

PreStart is an app that enables the automatic collection and distribution of vehicle specific PreStart checks. Operators use an in-cab multi-step interface to enter their PreStart check results.

These results are then sent back to the Smart Quarry Site database and are immediately visible to supervisors and the maintenance teams, through notifications. At each new shift operators are presented with PreStart.

Stored PreStarts are easily retrieved for compliance verification when needed.





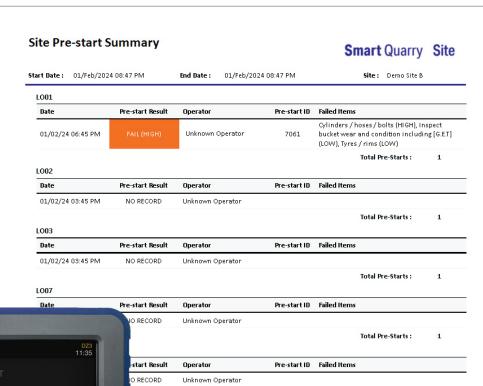


Detailed report for each daily PreStart – sent to key site stakeholders for actioning of defective items.

#### **Features**

- Specific PreStart covering locally customised list applicable to each machine. Includes OEM's and all machine types.
- · Assign severity to checklist items.
- Update and customise pre-start checks from anywhere.
- Automatic reporting (individual detailed report and summary report).
- Automatic notification of missed, failed, or incomplete pre-starts.
- Email notifications to the maintenance team allowing immediate action on machine defects.
- PreStart checklists are tied to operator ID.
- Geofenced speed zones specific to site.
- In cabin visual and audible alerts warning operators of speeding breaches reported back to SQS scheduled reports.





PRESTART

SUBMIT

43 Checks Incomplete

1-Walkaround Checks

Dump body condition
Here you can input some details.

Mirrors & windows

Machine grease points

Stanc / Indidese and bandenite

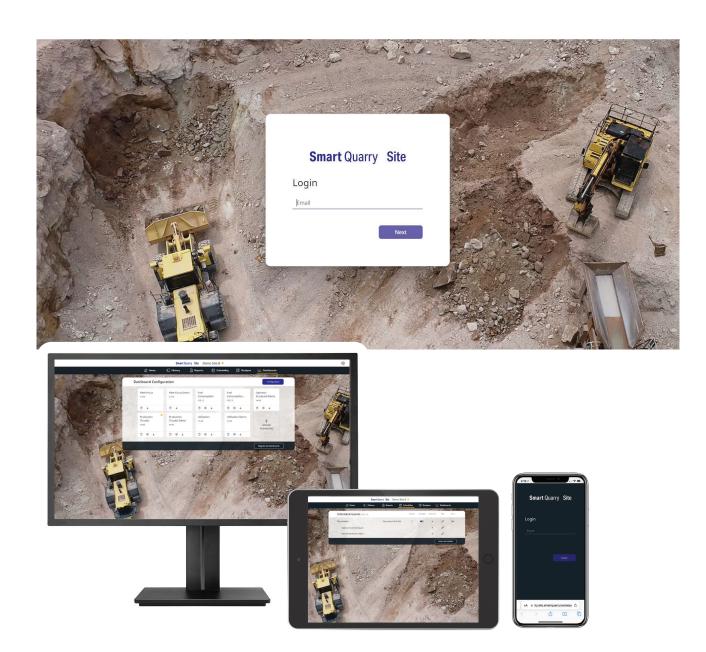
Summary PreStart report can easily be scheduled and made available for review or site audit requirements.



Free text can be easily added through editing feature of each defective PreStart item.

# **GoLine and User Management**

Simple access to your site, anywhere, on any device. GoLine is a user interface that provides Smart Quarry Site users direct access to their fleet and apps from one place.



#### **Overview**

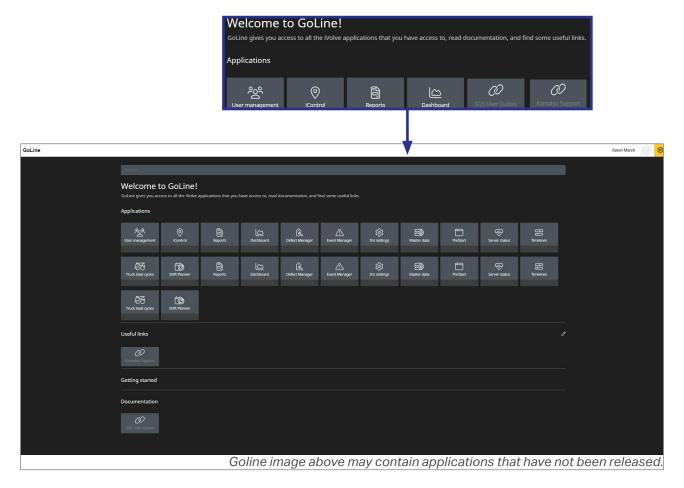
The following apps and tools are available (dependant on user permission);

- · Access your dashboards
- Access and schedule your reports
- Access your back-end management
- Access iControl\*
- Multiple site view available
- · Customise and favourite your dashboards
- Directly access Komatsu support and Smart Quarry Site user guides

#### **Recommended Web Browser**







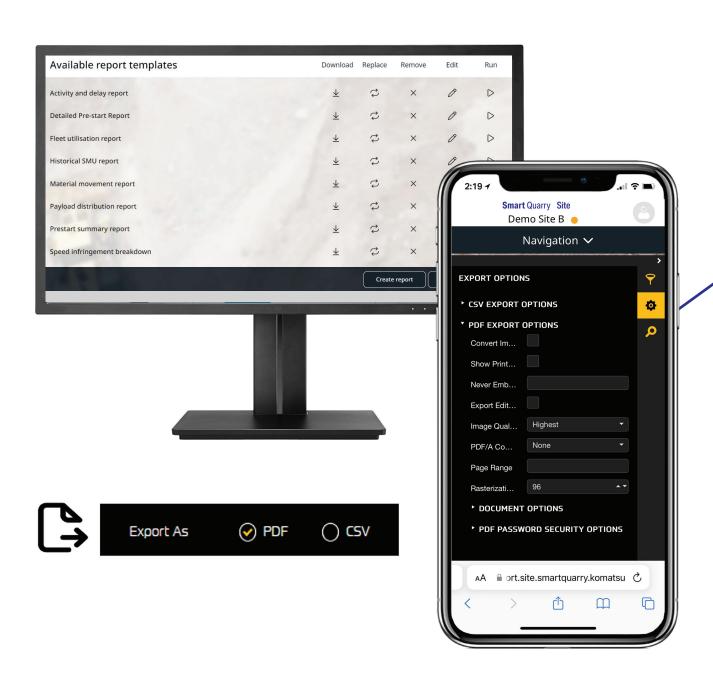
\* iControl Application must be first installed on your personal device (PC or Laptop).

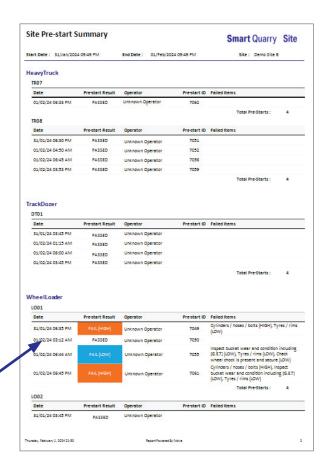
Note: Single sign on is under development to connect your cloud single sign on – AZURE/AWS/Google.

# **iReport**

iReport is an online reporting tool that can be accessed via Smart Quarry Site and provides summary production data in a format configured to site needs.

- Access all historical data: Easily schedule reports to anyone anytime
- Do it all: Save, print and share reports easily.
- **Set and forget:** To schedule recurring reports, choose a report, a time, and the recipients.
- **Universally accessible:** Install once, access anywhere and on any device.
- **Schedule reports:** Send multiple reports at once in .PDF or .CSV or both.





#### **Detailed PreStart Reporting**

- · Get instant notifications by email.
- Detailed summary report for each PreStart.
- Any item that fails a PreStart is sent by email to relevant site personnel.

#### **Summary PreStart Reporting**

- Be ready to support your site PreStart audits with full history of completed PreStarts and easily generate reports for any date range.
- View failed items for the history of your PreStarts.
- All failures are specific to the machine and based on severity.

#### **Reports**

- · Activity and delay report
- · Detailed pre-start report
- Fleet utilisation report
- Historical SMU report
- Material movement report
- · Payload distribution report
- Pre-start summary report
- Speed infringement breakdown

# **Dashboard Overview**

The Smart Quarry Site dashboards provide real-time and historical information about the production state, health and maintenance of your fleet. All data is updated in 5 minute increments.

Easily filter your dashboard view with incredible flexibility via the common menu along the top of the dashboards page.

Select specific date ranges filtered by shifts, circuits, by material types, operators, site fleet or by individual machines.

\*Multi site access is avaliable through Goline.

#### **Current Dashboards - Available**

**Utilisation Dashboard** – Included in standard package.

Fuel Dashboard – Included in standard package.

• ESG – Included in standard package.

Fleet Focus - Included in standard package.

 $\label{eq:condition} \textbf{Production (Trucks) Dashboard} - \textbf{Optional}.$ 

Operator Scorecard - Optional.

\*Dashboards are part of the SaaS – Software as a Service connected to your Smart Quarry Site Fleet Management solution Dashboards can be packaged to suit your requirements.



## **Utilisation Dashboard - Overview**



#### **Utilisation**

Graphical and tabular overview of the utilisation of your full fleet for incredible insights across site and using detailed granular data.

#### **Utilisation Dashboard - Summary**

Summarise your fleet by mapping where idle is taking place. At a glance see your utilisation and idle trends over a selected date range or by current shift. Highlight top performing operators.



#### **Utilisation Dashboard - Idling Insights**

Idling Insights allows you to visualise idling data via the mapping feature:

- High idle areas based on activity
- Select a date range or by current shift.
- Idling location and idling event.
- Idle time by operator.
- Idling location [geo referenced].
- Idling by operational activity.



## **Smart Quarry Site**



# Fuel Dashboard

#### **Fuel Consumption**

Fuel Consumption broken down by machine, fleet and operator in relation to working hours and SMU. Visualise through Fuel Dashboard:

- Fleet analysis litres per hour and litres per tonne.
- Fuel consumption litres per hour and litres per tonne.
- Individual operator analysis of operation by litres per hour.
- Select current shift, date ranges, by circuit, by machine, or by operator.



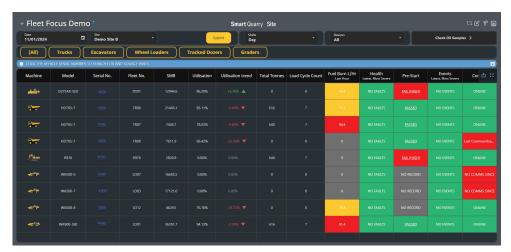
## **ESG**

#### **Fuel Consumption Dashboard - Emissions**

Emissions tab allows you to visuliase the emmission trends of your fleet and the carbon footfrint as a result:

- · Accumulated total fuel
- Footprint tonnes of CO<sub>2</sub>
- Average CO<sub>2</sub> / hour
- Average CO<sub>2</sub> / 1000 tonnes

- Emission intensity trucks
- · Circuit emissions trucks
- Fleet emission trends
- CO<sub>2</sub> utilisation idle vs working hours
- Operator analysis tCO2-e/hour



# Fleet Focus Dashboard

#### **Fleet Focus**

- **Serial No:** Links to the Komatsu store for simple search to source parts.
- SMR: The SMR is updated immediately as data is available through API or direct by J1939 CAN protocol.
- **Health:** Machine health at a glance shows last 3 active events.
- PreStart: Shows latest PreStart check result for the current shift and access to PreStart detailed report.
- **Events:** Latest 3 based on most severe events in the current shift for the given vehicle.
- **Communication:** Shows the latest communications status received from that vehicle in the current shift.



# Operator Scorecard Dashboard

### **Operator Scorecard**

Delivers at a glance operator performance by individual or benchmark against other operators at your site, enhancing operations and encouraging best practice. Quickly visualise:

- Operator efficiency based on the individual's last shift.
- The operator's rank movement from last shift.

• Group performance and category performance by group average.

These rankings are a collective from operational data, over 5 key metrics:

 Utilisation, speeding events, PreStart completion, production and fuel consumed during operation.

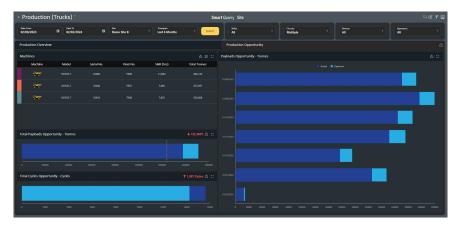
## **Production Dashboard - Trucks**



#### **Production**

- Machines: Your active production vehicles listed in an easy to view table with key data including model, serial number, site fleet number, SMR, and total tonnes.
- Production progress: Graph showing your production progress in tonnes throughout the shift.
- Payload distribution: Instantly know how efficiently your loading tool is loading the trucks. Overloads and underloads are easily identified with payload opportunity visualised.
- Circuit production: View the productivity (tonnage) of each circuit broken down by truck.

- Fleet production: View the productivity [tonnage] by each truck, broken down by material type
- Operator production: Easily monitor operator performance based on the 10, 10, 20 rule. Easily swap between truck models to view the relevant distribution curve.
- Summary view: Total tonnes combined productive and waste calculation. Show product tonnes, average payload for the fleet, total load cycles.



#### **Production Opportunity**

- At a glance understand the breakdown of total truck payload opportunity by tonnes and number of total load cycles.
- Benchmarked against actual production payloads and cycles completed.
- Make changes to production trucks

- immediately increasing production and shortening your ROI.
- Utilise the production information to target and monitor additional tonnes per cycle. Release significant profit from a small increase in average tonnage



## **iControl**

#### \*iControl - Application

iControl is a map-based tool that provides a real-time overview of the fleet and assets on site.

#### **Highlights:**

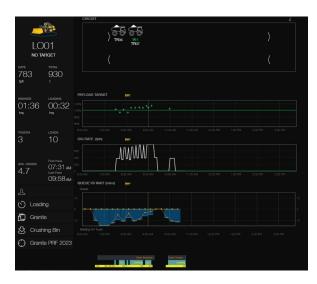
- Instantly see the location and status of vehicles & operators.
- Instant snapshots of production data for each vehicle and circuit.
- Dashboards show real-time progress of the shift vehicle timeline.

**Control:** Manage your backend by yourself, easily updating and editing production data, operators, vehicles, PreStarts, material lists and geofences.

**Analyse:** Replay, analyse and report historical fleet movements including position, speed, events, heading, operational height and PreStart status for each shift.

\*iControl updates machine position and production information every 30 seconds - Availability of the data may vary based on site connectivity across the site.

## iControl - Production



Visualise in real time your loading tool operation highlighting:

- Dig rates
- Total tonnes
- · Trucks loaded
- Number of trucks to loading tool
- Average passes per truck
- · Payload targets
- · Queue of trucks vs waiting on loading tool

## **Peer to Peer and Machine Handshake**

Once loading has been instigated, the vehicles will automatically "pair".

Retrospectively: the queue and spotting times will be back-calculated from when the truck crossed the queue and loading radius of the paired loader/excavator.

If for any reason pairing does not occur automatically, the truck/excavator operator can manually pair by tapping the highlighted vehicle ID box at the top of the screen.

Data is exchanged automatically between paired vehicles: vehicle IDs, target & actual tonnage, material, destination.



The Smart Quarry Site Mesh Network is made up of a collection of wireless networking devices running Smart Quarry Site mesh networking software.

These wireless devices "Machines" automatically recognise and talk to each other

The Smart Quarry Site Mesh Network automatically routes network traffic between the available wireless nodes so that it reaches the intended destination in the most efficient way possible.

# **Hardware – Main Components**

### **Ruggedised 8" Operator Panel**

The in cabin guidance allows operators to make changes on the run without supervisor intervention. The in-cabin device collects data automatically for the full production cycle. Easy to use interface with added machine specific electronic PreStart checks including automatic notifications to improve defect management.





#### **Features**

**Purpose built:** Excels in tough environments. Built to withstand high vibration, shock and wide temperature variance.

It offers high performance fanless operation and IP-65 certification.

**Quick installation:** A single light-weight cable with latched connector provides both power and data to the device. Various installation solutions are supported via a flexible RAM standard bracket.

#### **Ruggedised Smart Interface Cable**

The interface cable combines an industry leading machine interface catalogue with support for the latest generation of heavy machinery.

The interface cable packs our best interface technologies into a single, small, light-weight, ruggedised smart cable.



#### **Features**

Supports all Komtrax and Komtrax Plus interfaces including PLM.

Supports OEM agnostic interfaces including PLM Plug and Play operation. All platforms supported with remote updates available for software and firmware.

Quick downtime recovery with real-time fault detections, alerts and clean user interface SMW-311 multiband, 3-cable Global Cellular/LTE, Wi-Fi & GPS Antenna.



# The 3:1 Series antennas features 3 antenna elements in one radome

The unique feature of this model is that the cellular element (Cable 1) is extremely wide banded and can cover the traditional GSM/CDMA frequencies, 700 MHz LTE, 1.7 & 2.1 GHz AWS/UMTS bands and LTE/WiMAX at 2.5 or 3.7 GHz, all on a single board.





#### **Features**

The 3:1 antennas are compatible with legacy GPRS networks as well as next generation 4G and 5G networks.

The antenna also covers 2.4/5 GHz dual-band WiFi on the second antenna element.



## **Features and Benefits**

#### In-Cab/Operator Features

- · Simple, intuitive display design.
- Shift statistics displayed to both the operator and supervisor via dashboards for shared knowledge and tracking.
- New operator performance can be remotely monitored for quick feedback.
- Simple Sign-on. Operators sign on with the in-cab screen.
- Operator-centric data. All data logged is tied to a specific operator. This allows for monitoring and reporting of best work practices and pinpointing opportunities for training or enhancing operations by best practices.
- PreStart:
  - Flexible: Configure a simple pass/fail PreStart or more complex check lists customised for each vehicle's specific requirements.
  - Speedy fault reporting:
  - Eliminate Paper
  - PreStart policy to control when PreStart screen is presented (enable, disable, once per shift, once per shift per operator)
  - Free form comments on failed items (operator can add a comment to a failed item)
  - Auto-submit PreStart if not completed in set time (time configurable)

- Email notification on failed PreStart
- PreStart report (Detailed)
- PreStart summary report (Basic)
- Visualise product targets to optimise payload opportunities and loading distribution.

#### **In-Cab/Operator Benefits**

- · Ease of use with minimal distraction.
- Start operating more quickly to maximise working hours.
- Easily log and manage faults specific to the machines to keep vehicles operating.
- Speed up unscheduled maintenance response with notification of faults.
- · Eliminate time lost to manual data entry
- Clear instruction for operators with one source of truth.
- Real-time progress feedback for operators and their supervisors enables performance improvements.
- Save time on data collection by eliminating the need for log sheets.
- Improve accuracy of data collection by eliminating human error.
- · Easily locate vehicles and operators.
- Eliminate speeding events.

- Loader operators physically sees the PLM of the truck he is loading and can therefore max-load the truck
- Loading operator sees the centre of balance of the truck allowing him to better balance the load while loading

#### **In-Office Manager Features**

- Real-time data visualisation of your operation in the office.
- · Simple data monitoring and adjustments.
- Standard and customised reporting capability for both scheduled and ad-hoc reporting.
- Time usage model. Because each site typically runs their own specific time usage model [shifts Start-Finish], sites can configure their system to align with their requirements. This allows for ease of monitoring and reporting.
- Intelligent activity and delay handling. When a vehicle has been idle for a set time, the operator is prompted to either confirm if the current activity is still valid or to enter a delay code. If the operator does not take action, the vehicle automatically selects a delay code (such as "Unknown Delay").
- Have the ability to track all your production data by specific operator.
- Create specific machine PreStarts not generic items that don't reflect your machine, local options added or the brand of machine
- Setup notifications SMS and email to key stakeholders to manage PreStart faults
- Setup machine specific truck payloads to enhance the payload opportunity

#### **In-Office Manager Benefits**

- · Enables real-time production decisions.
- Understand exactly what your vehicles are doing and when to make decisions to optimise their efficiency.
- · Optimise vehicle utilisation.
- · Save time on manual data collection.
- Improve accuracy of data collection by eliminating human error.
- Easily log and manage faults to keep vehicles operating.
- Speed up unscheduled maintenance response with notification of faults.
- Eliminate time lost to manual data entry.
- Easily add new operators and create personalised operator ID

#### **GoLine Cloud-Manager Features**

- Web interface that provides Smart Quarry Site users direct access to their fleet and apps from one place
- · Cloud portal for fleet management
- Responsive design (desktop, mobile, tablet)
- Access all apps from one place
- Single Sign-on (SSO)\* available soon
- Hosted on Cloud but capable to be hosted On-Premise for remote sites.
- \*ON PREM requires consultation with your Komatsu representative
- Personalised experience though role based access and relevant information display
- · Multi-site capable

## **Smart Quarry Site**

#### **GoLine Cloud-Manager Benefits**

- Easy access on any network or connected web browser.
- No complicated sign-in process based on your role at the site
- Add new users through the in-office manager access
- For multi-site users see all sites easily through your user access – no complicated logins
- Local user management setup for individual users based on your role at the site quarry or construction site

#### **iReport Features**

- · Access all historical data anytime
- Do It All: Save, email, and share reports easily
- Set and forget: Schedule recurring reports, choose a report, a time, and the recipients.
   Universally accessible: Install once, access anywhere on any device.
- Dashboards show real-time progress of the shift.
- · Vehicle timeline.
- Replay, analyse, and report on historical fleet movements (including position, speed, heading, and operational height) and historical events.
- Manage operator, vehicle, and materials lists and geofences.
- · Easily update and edit production data.

#### **iReport Benefits**

- Instantly see the location and status of vehicles & operators.
- Instant snapshots of production data for each vehicle and circuit.
- Scheduling makes reporting easy, saving time gathering data to report to management or auditors

#### **Hardware Features**

- BM2 combines industry leading machine interface catalogue with support for the latest generation of heavy machinery.
- Quick downtime recovery with real-time fault detection, alerts, and a clean web interface.
- New ECM parameters added automatically via remote software update.
- In-cab display offers operator benefits from real-time operational feedback.
- · Purpose built

- · Quick installation
- Ultra-bright screen
- 3 in 1 antenna (GNSS, WIFI, LTE)

#### **Hardware Benefits**

- Supports all Komtrax, Komtrax Plus & PLM and most other OEM Interfaces
- Plug and play operation with all platforms
   – XS, XG and XD series.
- Converts proprietary machine data into an open standard suitable for analytics and artificial intelligence applications.
- Instant on and smart setup.
- Simplify installs using the same parts and process across different vendors consistent on all models
- Ruggedised equipment tested in the harsh environments of quarry and construction sites
- · Komatsu backed warranty and support
- Remote access to hardware to push updates and maintenance without needing costly site visits

## **Standard and Local Options**

#### Standard Options - Hardware

- · XD8 8" HD ruggedised operator panel
- 3:1 Antenna [GNSS/WIFI/LTE]
- · BM2 ruggedised Interface cable
- · PC Operator panel cab mounts
- · XD8 power cable
- Installation of hardware to each machine
- · Onsite commissioning for each machine

#### Standard Options - Software

- XD8 specific vehicle firmware / software
- · Remote access availability to the connected machine
- BM2 Specific vehicle firmware / software
- · Smart Quarry Site operational software and Installations
- · Five iControl PC Application installations

#### Optional or Required Non-Standard Options - Hardware\*

- · Site access points for poor connectivity on site
- · Komtrax translator High-res data from Komtrax enabled machines
- · Additional machine harness as required by the specific OEM
- · Upgraded controllers as required by the specific OEM
- \* Dependant on machine types, site connectivity and outcome of site readiness survey

NOTE: onsite Connectivity LTE, WIFI is the responsibility of the end user, our Komatsu Smart Construction team will advise and support as needed.

#### Standard, SaaS, Training and Access Options

- · Site readiness investigation and report
- Initial site master data site setup
- · Cloud hosting and server maintenance
- Software and firmware remote updates
- User management Go-line access base on permission levels
- · Single or multiple site access through Go-line
- Operator training each vehicle, including PreStart 1 day
- Fleet Focus dashboard Access
- · Utilisation dashboard Access
- Fuel dashboard Access
- Komatsu Support Email / Phone
- Electronic Specific PreStart Individual operator ID
- Peer to peer connected network
- Data and SIM LTE connectivity

#### Optional or Required Non-Standard Options - SaaS

- Required: Admin training Support your own site
- Required: Admin advanced training Support your own backend
- Optional: Production trucks dashboard
- Optional: Operator scorecard dashboard
- Optional: Customised reports Reports can be scheduled in the back office

Available standard and report types

Available Report Types			
SMU Report	Vehicle type, SMU value timestamp, latest SMU, Site name		
Fleet Utilisation	Vehicle, Discription, Last SMU, Total hours, Working hours, Idling hours, Of hours, Idle %		
Payload Distribution	Truck Payload Summary by Truck, Weight, Volume (BCM), Volume (BCM/ HR)		
Material Movement by Truck	Truck, Load location, Material, Dump destination, Loads, Weight, Volume (BCM)		
Activity and Delay	Machine name, delay type, delay count, delay duration (hours)		
Detailed pre-start	PreStart ID, unit, date, operator name check result based on severity, by catergory		
Prestart summary	Seperated by vehicle, start and end date, PreStart result, by operator, PreStart ID, failed items		
Speed infringement breakdown	Device, infringement start and end, operator, speed limit, actual speed, above mimit, total infrongements by Geofenced circut		
Individual speed infringements	Machine name, Geofence, infringement start and end, duration, speed limit, max speed recorded, Km/I above limite, total infringements		

## **Smart Quarry Site**

	Other OEM			
Products by Class (Not model dash specific)		KOMTRAX Enabled [Construction Class]"	KOMTRAX Plus [Mining Class]	Other OEM's – with Telemetry available Data [J1939 or API or PLM]
Model	Model Series	J1939 / API / *PLM	J1939 / PLM	[51939 OF AFTOFFEM]
RDT	HD325, HD405	<b>©</b>		Equivalent size units from other OEM available
	HD605, HD785			
*ADT	HM300, HM400	•		Equivalent size units from other OEM available
Excavator	PC130, PC138, PC200, PC210, HB205			
	HB215, PC220, PC240, PC270, PC290	•		Equivalent size units from
	PC300, PC360, PC450, PC490, PC600			other OEM available
	PC700, PC800, PC850,	•		
	PC1250			
Loader	WA150, WA200, WA250, WA270,			
	WA320, WA380, WA430, WA470	•		Equivalent size units from
	WA480, WA500			other OEM available
	WA600, WA800, WA900		<b>©</b>	
Dozer	D61, D65, D71, D85, D155, D275			Equivalent size units from other OEM available
	D375, D475		<b>②</b>	
Grader	GD655, GD825	•		Equivalent size units from other OEM available
Other	WB97R, SK820	•		Equivalent size units from other OEM available

#### \*PLM may be available on some construction models like ADT

**Note:** J1939, PLM and API connectivity to Smart Quarry Site is dependent on hardware installed on the base machine, a site readiness survey will be conducted to determine any requirements for further hardware or software – Covered under the Optional or Required Non-Standard Options – Hardware



Learn more about Smart Construction by contacting your local Komatsu representative or visit: https://komatsu.com.au/innovation/smart-construction/isite

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