

# Tritronics ShovelPRO Shovel Monitor



ShovelPro provides material weights, material volumes, loading times, number of bucket passes, equipment downtime, and related activities to mining personnel. The Monitor is the result of 12 years worldwide experience in machine monitoring and control. A team of engineers, using the latest technology, has crafted the most advanced shovel monitoring system available today.

## Compatibility

The Shovel Monitor is compatible with all types of electric shovels—AC and DC drives. It connects to PLC based shovel electronics or directly to older style control systems.

## Information provided by the Monitor

- Material weight in each bucket
- Material volume in each bucket
- X, Y, Z position of each bucket—both engage point, disengage point, and dump point
- Full diggibility information for analysis
- Tons in each truck loaded
- Trucks in queue with I.D. if fitted with FMS or Dispatch fleet systems
- Mine planning information versus the actual digging information shown in real time on the operator's color display

- Operator specified blast results and loading conditions – for example, loads of oversize or wet loads
- Vital signs monitoring, including real-time parameter display
- Full integration with OreNAV
- Ability to email messages via mine's email system

## Office Software Tools

- Windows 2000 based client/server operating system
- Online HELP with indexes
- 3D graphics and graphics tools
- User definable reports using Crystal Reports
- Compatible with Microsoft Office Suite
- Advanced data editors for data entry corrections
- Reports can be scheduled to print at a preset time or emailed to a recipient list
- Secure fully SQL compliant database for mass data storage with an "Open" database structure

## Integration with FMS

- The Monitor is fully integrated into Tritronics' Fleet Monitoring System (FMS) as well as the Modular Mining Dispatch system

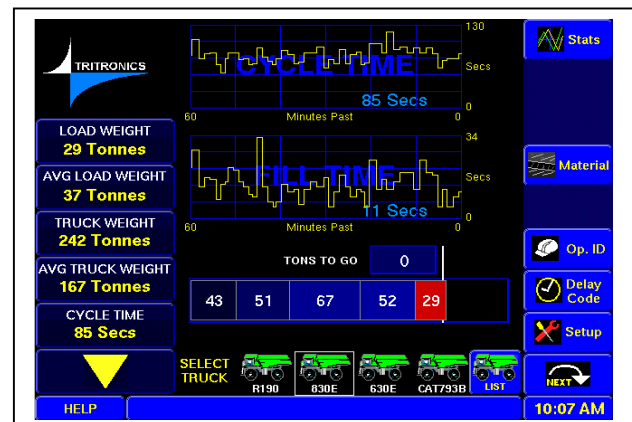
## Measurement Accuracy

- Bucket weighing within 2% of the true weight for 95 out of 100 loads and all loads will be accurate to +/-5%.

## Bucket Calibration

Bucket calibrations using the Monitor require no external software/hardware and are performed by operators.

## OPERATOR DISPLAY



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## Interfaces

The Monitor interfaces to automation and control systems and supports PLC protocols such as MODBUS. A standard interface is provided to enable third party devices to query the Monitor for information. The Monitor is able to provide detailed electrical, mechanical and production information via this interface.

## Operator Feedback

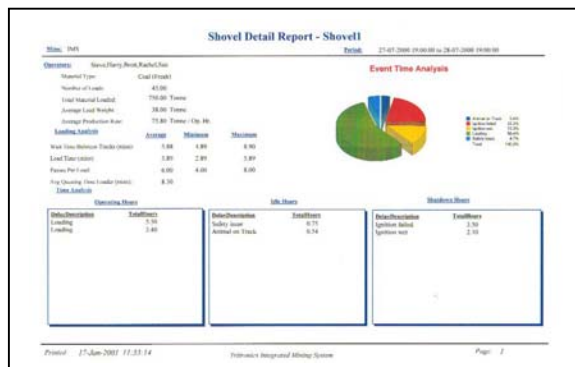
The operator interface is a full VGA color LCD touch screen. The panel is a crisp and clear display to allow good visibility in direct sunlight and can be adjusted to reduce brightness at night.

**Delay Codes** - The panel displays a list of delay codes. The operator can page through the list if there is more than one screen of data. The displayed order of the codes is definable by each site. A voice synthesizer prompts the operator to input a delay code when the Monitor detects an idle period beyond a preset time.

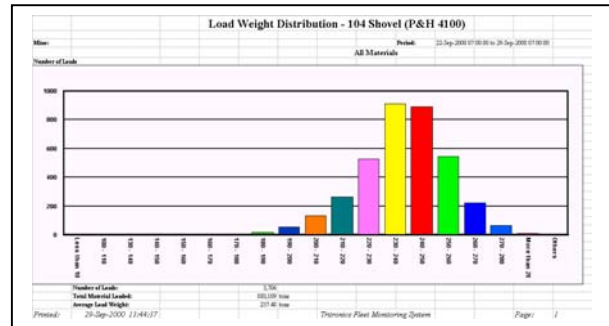
**Shift Summary** - The system displays a chronological list of the events (delays, positioning, digging, idle time), which occurred during the shift, together with a summary of total production (cycles and tons).

**Graphical Feedback** - The panel is able to display trend graphs of selected variables. The operator can select the variables displayed and the time scale.

## SAMPLE REPORT 1



## SAMPLE REPORT 2



The panel also provides:

- Operator selectable statistics
- Short range forecast information for inclusion on production graphs
- Mine planning information - current location and location of next digging
- Saving of operator 'profiles' to allow each operator to have a custom display and a history of their performance - these can be downloaded via telemetry
- The panel allows entry of shift comments from a predefined list
- Digging depth can be set with a voice announcement when the bucket is within 3 feet of the set point
- Display of OreNAV data

## GPS Positioning

The Monitor comes standard with GPS receiver with the option of Real Time Kinematic (RTK) GPS receiver. The Monitor will be able to provide an accurate position for the center of the tub, the boom tip, and the bucket.

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