

Using **Mobile Apps** for Fleet and Personnel Management

DW

Data Warehousing / Big Data

Data integration from any
source into appropriate
repository:
*Relational, Process,
Dimensional, NoSQL*

Business & Operational
Intelligence

Performance Gamification

CS

Consulting Services

System audits:
*e.g. identify opportunities then
help mines use Pi, MineStar &
Terrain better*

Mine Automation Consulting

FARA

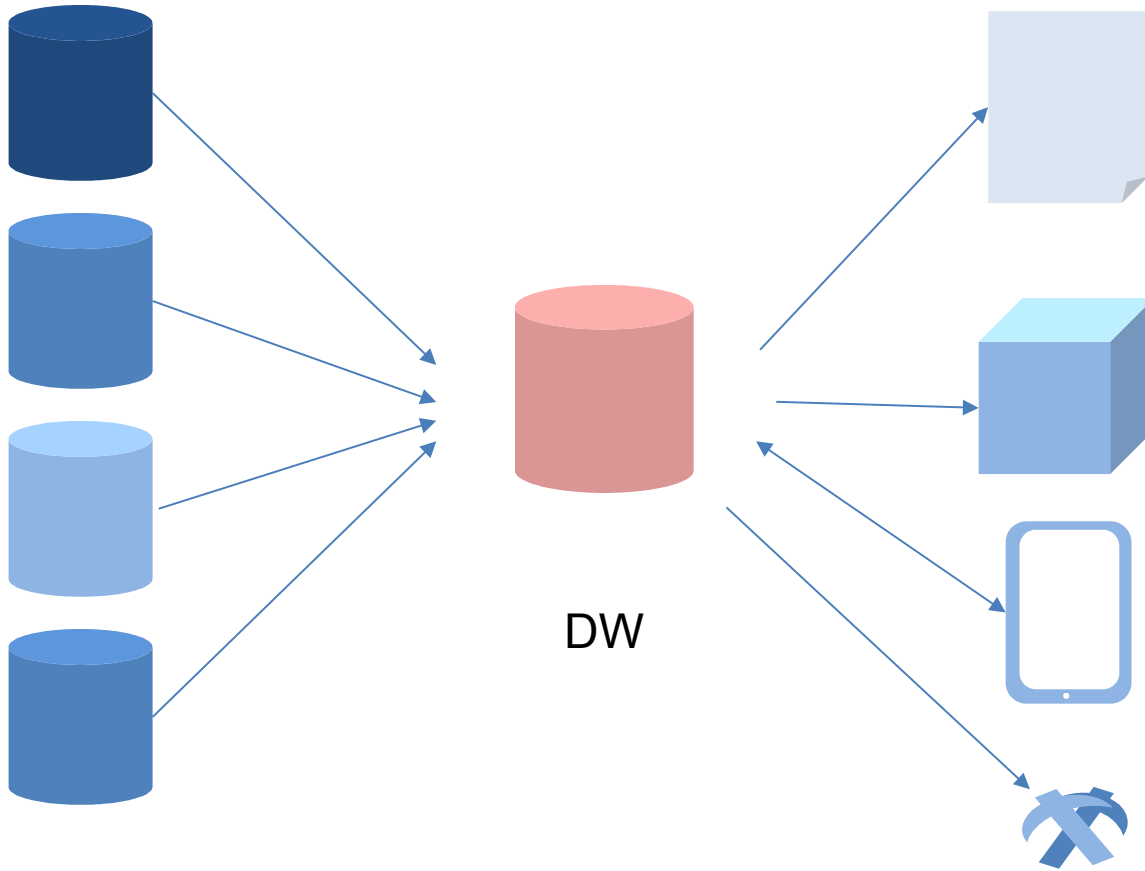
Field Analysis & Reporting Application

Supervisor paper-replacement App

SCADA & real-time system mobile
interaction platform

Fleet & Personnel Management
System App

Internet of Things (IoT) tracking
through BLE beacons

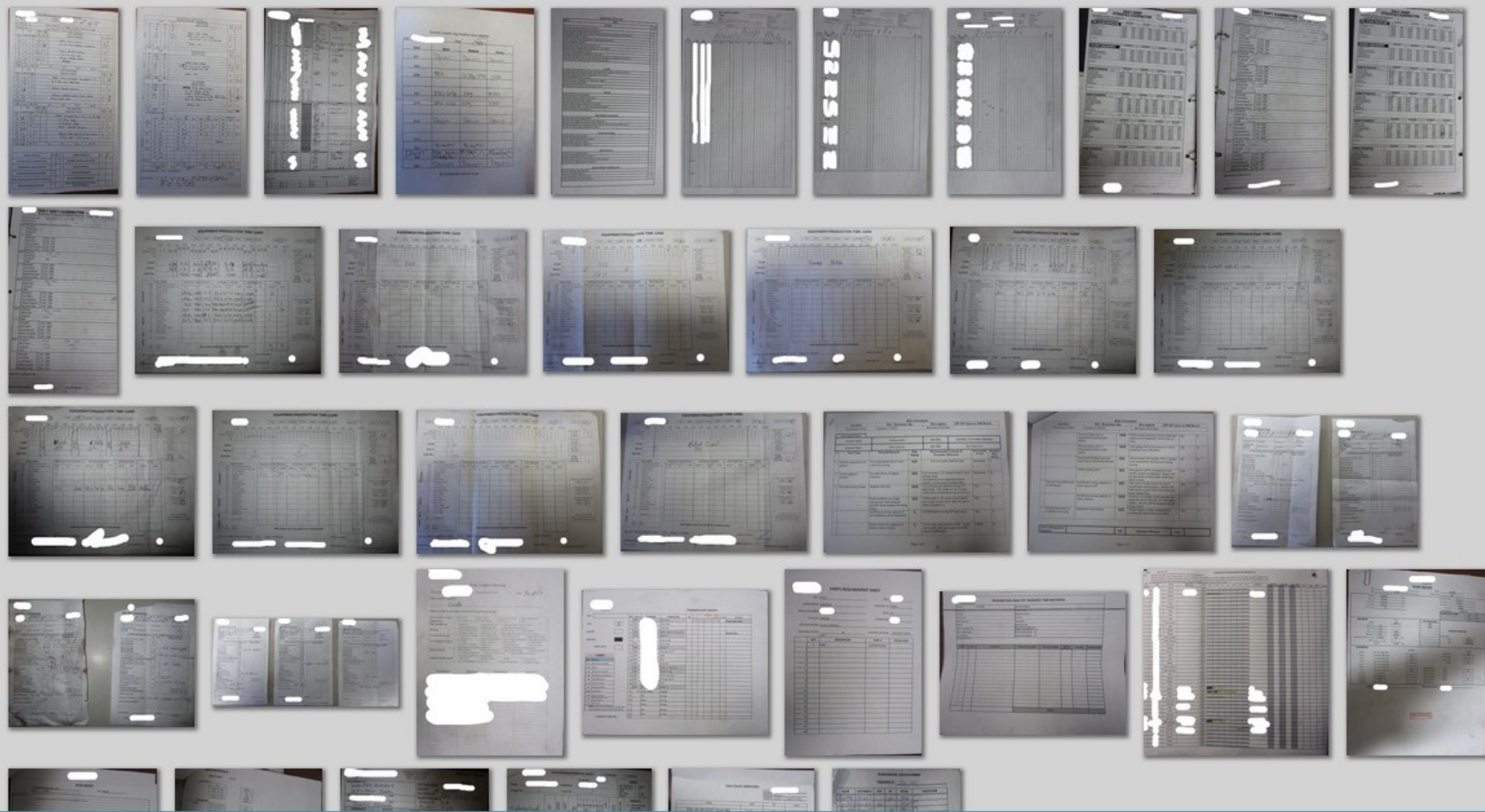


Large metallurgical coal mine British Columbia, Canada



ne - January 6, 2013 (39 images)

Click a picture to see a larger view.



_____ - January 6, 2013 -- Daily Shift Operating Plan & Report (Front) - Supervisors fill this out three times a day (once for each section). All information is gained through radio communications. This sheet is used to fill out a spreadsheet for the general foreman. It is also provided to engineering.

First | [Previous Picture](#) | [Next Picture](#) | [Last](#) | [Thumbnails](#)

Daily Shift Operating Plan & Report - Wolverine

Date: _____ Foreman: _____ Crew: A / B / C / D
 # on shift: 51 Load Name: _____ Shift: 05:15 Night
 # Absent & Reason: _____ like No Operator
 OT Project: _____

| 11:00 - First Coffee | | 3:00 - Second Coffee | | 7:00 - End of Shift | |
|----------------------|------------|----------------------|---------------------|---------------------------------------|-------------|
| Enter | Actual | Target | Reason for Variance | Hours Lost | Cum. Hrs. |
| 201 | X | 28 | X | | |
| 206 | 17 | 33 | 795 Z | DOWN - BURN LITING | 4 |
| 210 | 473 | 36 | 780 Y | 5.5 hr. lost due to equipment failure | 1.5 |
| 212 | X | 61 | X | | |
| 301 | 18 | 0 | 800 D | DOWN - BUCKET MALFUNCTION | 4 |
| 303 | X | 0 | X | 1 hr. lost - hyd. pump | 1 |
| 305 | 28 | 36 | 740 Z | DOWN - GREASE SYSTEM | 4 |
| 205207 | 6 | 0 | | DOWN | |
| Total | 174 | 167 | | | 13.5 |

| 3:00 - Second Coffee | | 7:00 - End of Shift | | | |
|----------------------|------------|---------------------|---------------------|--------------------------------------|-----------|
| Enter | Actual | Target | Reason for Variance | Hours Lost | Cum. Hrs. |
| 201 | X | 64 | | | |
| 206 | 37 | 76 | | DOWN - STICK CHANGERS TOO SLOW 17:17 | 4 |
| 210 | 90 | 91 | | 2.5 hr. lost - hyd. pump | 2.5 |
| 212 | X | 143 | | | |
| 301 | 10 | 0 | | DOWN - BUCKET MALFUNCTION | 4 |
| 303 | X | 0 | | | |
| 305 | 21 | 88 | | DOWN - GREASE SYSTEM / BLDG. MAINT. | 4 |
| 205207 | 22 | 0 | | DOWN - HYD. PUMP | 4 |
| Total | 219 | 269 | | | |

| 7:00 - End of Shift | | | | | |
|---------------------|------------|------------|---------------------|--|-----------|
| Enter | Actual | Target | Reason for Variance | Hours Lost | Cum. Hrs. |
| 201 | X | 82 | X | | |
| 206 | 46 | 108 | | DOWN - COLLIDER BURN - STICK CH. MALFUNCTION | 4 |
| 210 | 104 | 130 | | 1 hr. blast delay | 1 |
| 212 | X | 204 | X | 2 hr. blast delay | 2 |
| 301 | 649 | 0 | | DOWN - BUCKET MALFUNCTION | 4 |
| 303 | X | 0 | X | Clamp after blast / load malfunctions | 4 |
| 305 | 24 | 125 | | 8 hr. lost - hyd. pump | 4 |
| 205207 | 21 | 0 | | | |
| Total | 261 | 555 | | | |

| Activity - Check List | YES | NO | Activity - Check List | YES | NO |
|-----------------------------------|-----|----|---------------------------------|-----|----|
| Are 2 Man Buses Available For Use | ✓ | | Did Blast Take More Than 30 Min | ✓ | |
| Did Man Buses Leave Dry By 7:15 | ✓ | | Are DCU Stakes In | ✓ | |
| Are Haul Road Conditions Suitable | ✓ | | Are Dig Limit Stakes In | ✓ | |

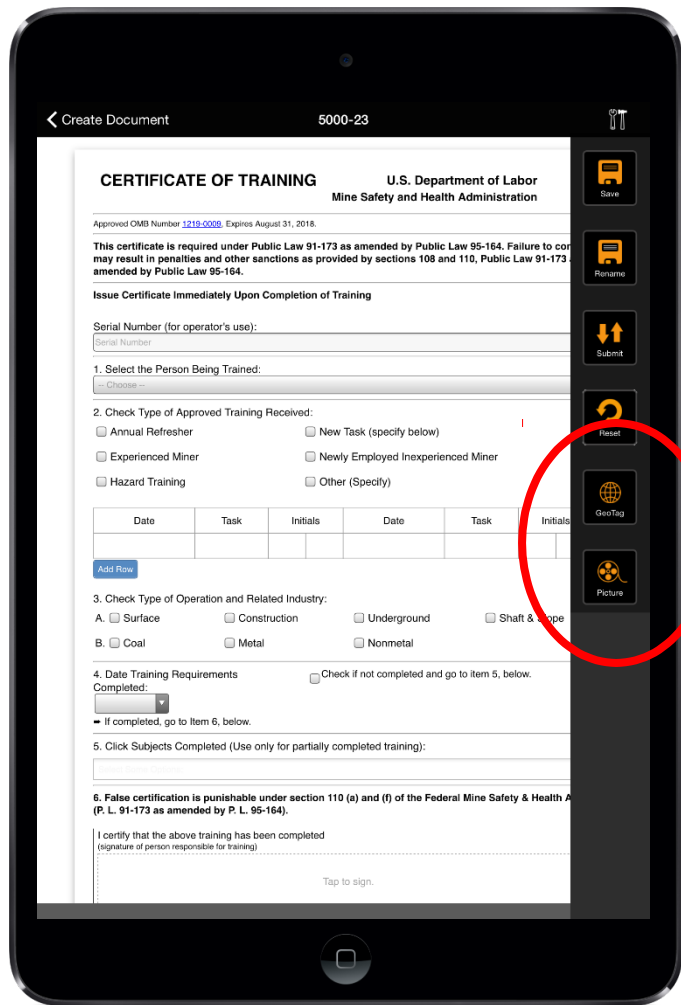
SAFETY

PRE-TRIP INSPECTIONS

PRODUCTION SHEETS

TIME SHEETS AND CARDS





TOP 10 REASONS I PROCRASTINATE

1.

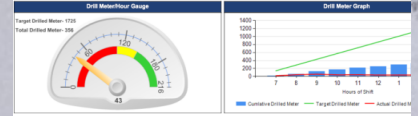
Interactions Quality & Quantity

Safe Work Observations (SWO)

| | SWO Rate | | | Incident Rate | |
|------|----------------------------|------------|-----------|--------------------|-----------|
| | Avg Quarterly Observations | % Increase | | Avg. Incident Rate | Reduction |
| 2012 | 4060 | baseline | 2010-2011 | 6.59 | |
| 2013 | 5500 | 35% | | | |
| 2014 | 6045 | 49% | 2012-2014 | 4.53 | 31% |

Change Management: Reports & Dashboards In The Field



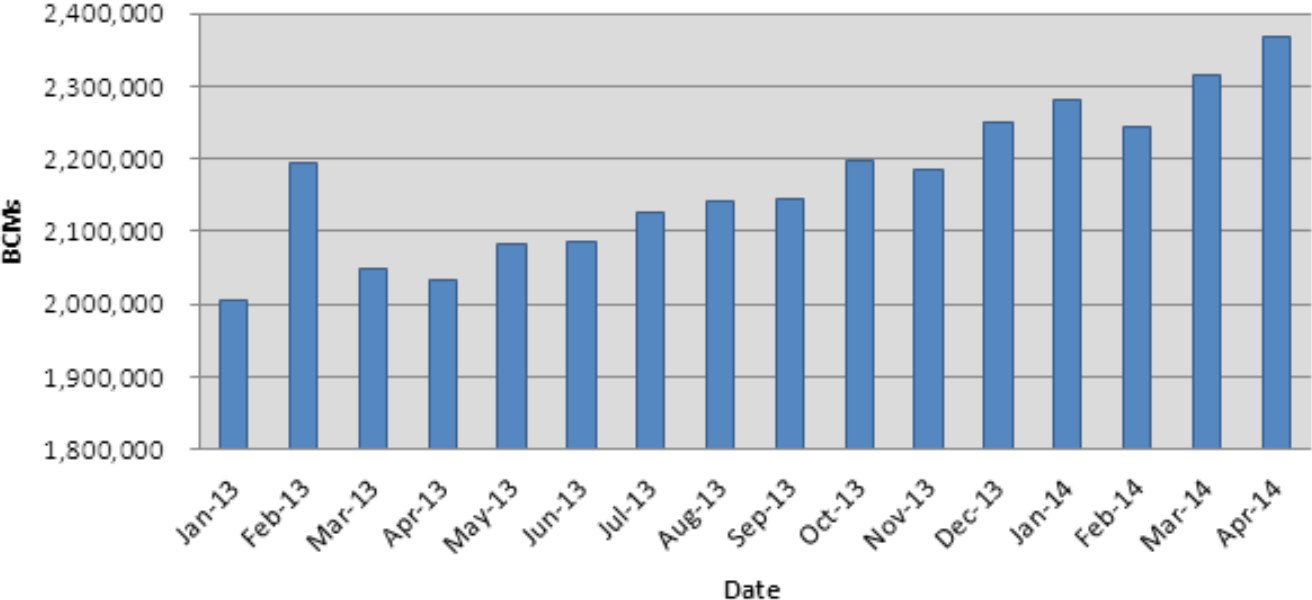


| Drill | Operator | Total Drilled Meters | Drill Duration | Goal Meters/Hr | Actual Meters/Hr | Prog. Drilling Rate Time | Last Drilling Total |
|--------|--------------|----------------------|----------------|----------------|------------------|--------------------------|---------------------|
| DL110 | Melika Brown | 102.98 | 7.43 | 13.85 | 13.85 | 1/10/2014 | 1/10/2014 |
| DL131 | Bill Hunt | 201.51 | 6.54 | 30.81 | 30.81 | 1/10/2014 | 1/10/2014 |
| DL1018 | Phil Swartz | 102.98 | 6.54 | 15.75 | 15.75 | 1/10/2014 | 1/10/2014 |

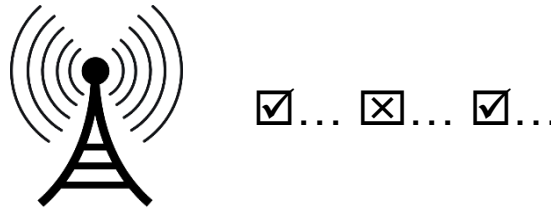
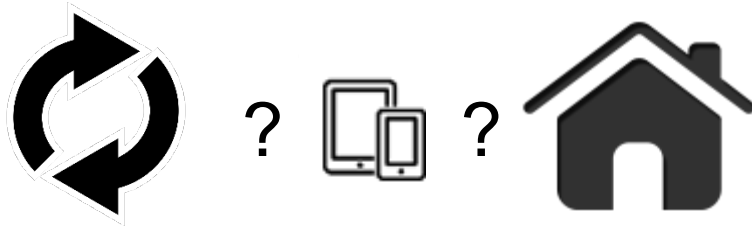
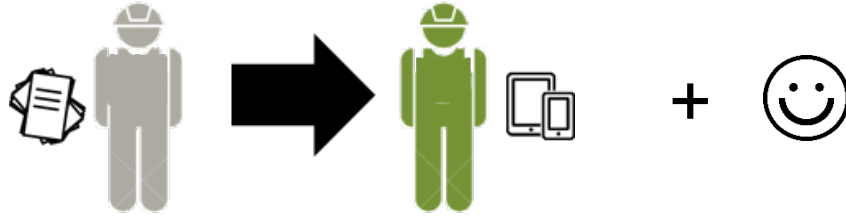
| Customer | 7:00-8:00 | | 8:00-9:00 | | 9:00-10:00 | | 10:00-11:00 | | 11:00-12:00 | | 12:00 | | |
|----------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|--------|--------|
| | Total Actual Drilled Meters | Total Target Drilled Meters | Total Actual Drilled Meters | Total Target Drilled Meters | Total Actual Drilled Meters | Total Target Drilled Meters | Total Actual Drilled Meters | Total Target Drilled Meters | Total Actual Drilled Meters | Total Target Drilled Meters | Total Actual Drilled Meters | | |
| DL110 | 102.98 | 205.97 | 8.2 | 29.00 | 8.0 | 29.00 | 27.3 | 29.00 | 8.36 | 29.00 | 16.7 | 29.00 | 16.30 |
| DL131 | 201.51 | 403.02 | 8.2 | 29.00 | 13.1 | 29.00 | 24.1 | 29.00 | 30.78 | 29.00 | 14.13 | 29.00 | 30.27 |
| DL1018 | 102.98 | 205.97 | 14.4 | 24.00 | 30.75 | 34.00 | 31.32 | 34.00 | 33.00 | 34.00 | 24.99 | 29.00 | 23.0 |
| DL111 | 308.47 | 616.94 | 34.09 | 51.19 | 66.18 | 66.18 | 62.81 | 102.27 | 116.14 | 130.38 | 144.21 | 170.40 | 166.81 |
| Customer | | | | | | | | | | | | | |

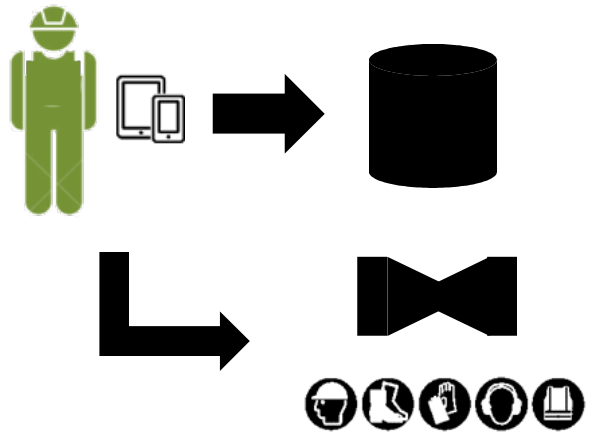
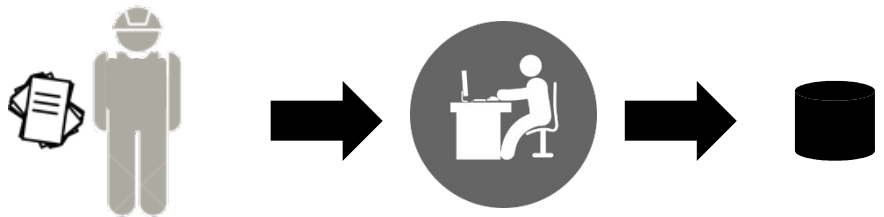
Dashboards & alerts:
immediate
corrective action

INCIDENTAL: PRODUCTIVITY IMPROVEMENT



BCM
2.01 M → 2.36 M
+17%







| | |
|-------|-----------|
| Date | 4/10/2014 |
| Shift | Day |

Shift Pass Along Report

Safety/Areas Inspections

| Interactions | |
|------------------------|------------------|
| Document Count | Comments |
| 5 | High wall Safety |
| Daily Area Inspections | |
| Document Count | Comments |

Checklist / Area Actions

| Shovel Checklist | |
|---------------------|------------------------------|
| Document Count | Comments |
| | |
| Drill Checklist | |
| Document Count | Comments |
| | |
| Truck Checklist | |
| Document Count | Comments |
| | |
| Shovel 60 Checklist | |
| Document Count | Comments |
| 1 | The perfect setup (1011 W58) |

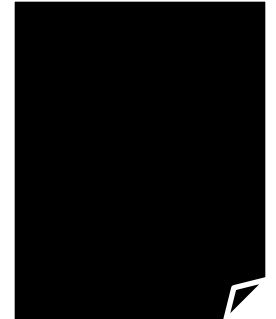
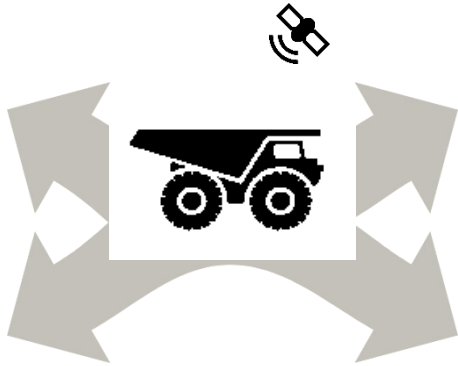
Shovels

| Shovel | Latest Status | Loads | Location | Top Three Unproductive Events |
|--------|---------------|-------|-------------|--|
| 212 | Delay | 158 | P4-0981-J81 | Blasting 45; Lunch 35; EQUIPMENT IN WAY 10; MANUVERING 10; |
| 215 | Ready | 125 | P4-1011-F48 | Blasting 95; Lunch 35; MANUVERING 9; |
| 210 | Delay | 89 | P4-0996-F05 | Blasting 80; Lunch 35; MANUVERING 10; MANUVERING 10; |
| 305 | Delay | 79 | P4-0996-F05 | Blasting 50; LUBE 12; |
| 201 | Standby | 0 | P4-0986-J80 | |
| 205 | Standby | 0 | P4-0981-J81 | |
| 207 | Standby | 0 | 1011-TD | |
| 213R | Standby | 0 | 1026 X/PIT | |
| 301 | Down | 0 | SHOP | |
| 303 | Ready | 10 | BRK;STK | |

Mobile + DW



Excel-o-philia



Down generated from FMS

| | | | | | | |
|---------------|-------|-----------------|-----------------|---------------------------|--------|---|
| Update | HA421 | Cab | NO AIR IN SEAT | 04 February 2014 04:00:01 | 993896 | replace @bat to CAT/ Strut campaign |
| Cancel | | | | | | |
| Edit | HA424 | Steering | STEERING COUNM | 2/4/2014 9:00 PM | 993932 | replace steering column |
| Edit | HA427 | BACK LOG REPAIR | | 2/4/2014 7:00 PM | 968652 | PM done/ Compressor not building air , main drive gear wore out/ front brakes measure 100% suspect warped b |
| Edit | HA473 | PM Wash | | 2/5/2014 7:00 PM | 991957 | 2400hr PM/Back log |
| Edit | LR301 | Bucket | FUNCTION ISSUES | 2/4/2014 7:00 PM | 992113 | new valve is here, may want to do a hyd flush on the tank , and filters, valve in progress |

Field & shop maintenance insert comments

| | | | | | | |
|---------------|--------|---------------------|--------------------------|-------------------|----------|------------------------------|
| Edit | EX201 | HYDRAULIC | | 2/5/2014 6:00 PM | 993288 | Replace Right hand stick cyl |
| Edit | EX213R | HYDRAULIC | LEAK | | | |
| Update | HA421 | Cab | NO AIR IN SEAT | 04/2014 4:00:01 | 993896 | |
| Cancel | | | | | | |
| Edit | HA424 | Steering | STEERING COUNM | | | |
| Edit | HA427 | BACK LOG REPAIR | | | | |
| Edit | HA473 | PM Wash | | | | |
| Edit | LR301 | Bucket | FUNCTION ISSUES | | | |
| Edit | DZ511 | Blade/Cutting Edges | HARD BAR | | | |
| Edit | DZ516 | Blade/Cutting Edges | CORNER BIT | | | |
| Edit | LR602 | Propel Mech | DRIVE SHAFT | 3/4/2014 3:00 PM | | Rear axle from Sing |
| Edit | PK701 | FUEL SYSTEM | ISSUES | | | At MegMar |
| Edit | ST106 | Equip Damage | INCIDENT/CAB DAMAGED | 2/11/2014 7:00 PM | 994960 | Cab Damage |
| Edit | ST805 | Suspension | LEAF SPRINGS | | | rear u bolts |
| Edit | ST806 | Air System | AIR COMPRESSOR AND CRANE | 2/9/2014 12:00 AM | FC990631 | At Megmar |

Entered & updated expected "up" date & time.

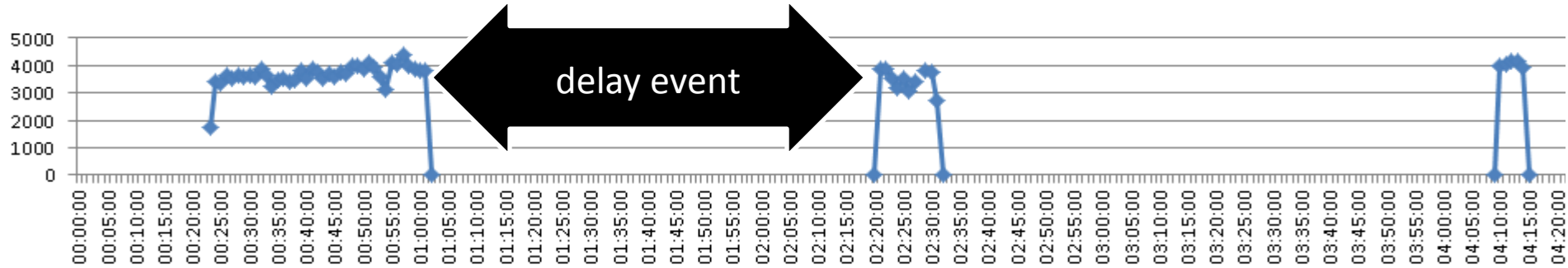
Select from a list of active WO or PO's against the down equipment (from Oracle & e-mesa)

| | | | | | | |
|---------------|--------|---------------------|--------------------------|---------------------------|----------|---|
| Edit | EX213R | HYDRAULIC | LEAK | | | |
| Update | HA421 | Cab | NO AIR IN SEAT | 04 February 2014 04:00:01 | 993896 | |
| Cancel | | | | | | |
| Edit | HA424 | Steering | STEERING COUNM | 2/4/2014 9:00 PM | 962223 | replace steering column |
| Edit | HA427 | BACK LOG REPAIR | | 2/4/2014 7:00 PM | 962225 | |
| Edit | HA427 | BACK LOG REPAIR | | 2/4/2014 7:00 PM | 963556 | PM done/ Compressor not building air , main drive gear wore out/ front brakes measure 100% suspect warped brakes as we are getting a lot of brake shoes |
| Edit | HA473 | PM Wash | | 2/5/2014 7:00 PM | 993896 | |
| Edit | HA473 | PM Wash | | 2/5/2014 7:00 PM | FC989149 | 2400hr PM/Back log |
| Edit | HA473 | PM Wash | | 2/5/2014 7:00 PM | FC992763 | |
| Edit | LR301 | Bucket | FUNCTION ISSUES | 2/4/2014 7:00 PM | FC993097 | new valve is here, may want to do a hyd flush on the tank , and filters, valve in progress |
| Edit | DZ511 | Blade/Cutting Edges | HARD BAR | | | |
| Edit | DZ516 | Blade/Cutting Edges | CORNER BIT | 2/9/2014 7:00 PM | 993755 | corner frog broke off , welding back on |
| Edit | LR602 | Propel Mech | DRIVE SHAFT | 3/4/2014 3:00 PM | | Rear axle trunion/dishwasher/2 items short ETA 01/21/14 POS25925. Finning lost truck shipment ETA 01/24/14 in progress Parts arrive on site. Trunion enroute from Singapore ETA 04-Feb-2014 |
| Edit | PK701 | FUEL SYSTEM | ISSUES | | | At MegMar troubleshoot intermittent fuel pedal not responding problem |
| Edit | ST106 | Equip Damage | INCIDENT/CAB DAMAGED | 2/11/2014 7:00 PM | 994960 | Cab Damage/ replace fuel transfer pump.Finning PG ETA Jan 28th Will have to put ralling and strobe light on |
| Edit | ST805 | Suspension | LEAF SPRINGS | | | rear u bolts are loose , never go to today |
| Edit | ST806 | Air System | AIR COMPRESSOR AND CRANE | 2/9/2014 12:00 AM | FC990631 | At Megmar received quote waiting on decision. Quote in review,req being built |





Downtime from Weight on Belt:



- Event Start
- Event end
- Delay code



Cambio del Tiempo de Paro

Arrastre la columna aquí para aplicar un filtrado

| Turno | Inicio | Fin | Equipo | Clase | Detalle | Duración | Editar |
|----------|---------------------|----------|------------------------------------|-----------------------------|-----------------|----------|--------|
| Matutino | 2015-02-13 07:24 AM | 07:54 AM | Quebradora Giratoria Primaria (QG) | TIEMPO DE PRODUCCION (TP) | Producción | 29 | Editar |
| Matutino | 2015-02-13 07:53 AM | 07:59 AM | Quebradora Giratoria Primaria (QG) | TIEMPO DE PRODUCCION (TP) | Corriendo Vacío | 5 | Editar |
| Matutino | 2015-02-13 07:58 AM | 08:48 AM | Quebradora Giratoria Primaria (QG) | TIEMPO DE PRODUCCION (TP) | Producción | 49 | Editar |
| Matutino | 2015-02-13 08:47 AM | 08:55 AM | Quebradora Giratoria Primaria (QG) | TIEMPO DE PRODUCCION (TP) | Corriendo Vacío | 7 | Editar |
| Matutino | 2015-02-13 08:54 AM | 11:54 AM | Quebradora Giratoria Primaria (QG) | TIEMPO DE PRODUCCION (TP) | Producción | 179 | Editar |
| Matutino | 2015-02-13 06:00 AM | 07:15 AM | Quebradora Giratoria Primaria (QG) | TIEMPO DE PRODUCCION (TP) | Producción | 74 | Editar |
| Matutino | 2015-02-13 07:14 AM | 07:25 AM | Quebradora Giratoria Primaria (QG) | MANTENIMIENTO NO PROGRAM... | Sin Movimiento | 10 | Editar |
| Matutino | 2015-02-13 06:00 AM | 11:56 AM | Transportador de Banda # 2 (TB02) | TIEMPO DE PRODUCCION (TP) | Producción | 355 | Editar |
| Matutino | 2015-02-13 08:54 AM | 12:05 AM | Transportador de Banda 1 (TB01) | TIEMPO DE PRODUCCION (TP) | Producción | 190 | Editar |
| Matutino | 2015-02-13 06:00 AM | 07:12 AM | Transportador de Banda 1 (TB01) | TIEMPO DE PRODUCCION (TP) | Producción | 71 | Editar |
| Matutino | 2015-02-13 07:11 AM | 07:27 AM | Transportador de Banda 1 (TB01) | TIEMPO DE PRODUCCION (TP) | Corriendo Vacío | 15 | Editar |
| Matutino | 2015-02-13 07:26 AM | 07:53 AM | Transportador de Banda 1 (TB01) | TIEMPO DE PRODUCCION (TP) | Producción | 26 | Editar |
| Matutino | 2015-02-13 07:52 AM | 08:00 AM | Transportador de Banda 1 (TB01) | TIEMPO DE PRODUCCION (TP) | Corriendo Vacío | 7 | Editar |
| Matutino | 2015-02-13 07:59 AM | 08:48 AM | Transportador de Banda 1 (TB01) | TIEMPO DE PRODUCCION (TP) | Producción | 48 | Editar |
| Matutino | 2015-02-13 08:47 AM | 08:55 AM | Transportador de Banda 1 (TB01) | TIEMPO DE PRODUCCION (TP) | Corriendo Vacío | 7 | Editar |



Cambio del Tiempo

| Equipo | Turno | Inicio | Fin | Equipo | Clas |
|--|----------|---------------------|----------|------------------------------------|------|
| ▼ Equipo: Quebradora Giratoria Primaria (QG) (3) | | | | | |
| ▼ Detalle: Sin Movimiento (1) | | | | | |
| | Matutino | 2015-02-13 07:14 AM | 07:25 AM | Quebradora Giratoria Primaria (QG) | MA |
| ▼ Detalle: Producción (4) | | | | | |
| | Matutino | 2015-02-13 08:54 AM | 11:54 AM | Quebradora Giratoria Primaria (QG) | TIE |
| | Matutino | 2015-02-13 07:24 AM | 07:54 AM | Quebradora Giratoria Primaria (QG) | TIE |
| | Matutino | 2015-02-13 07:58 AM | 08:48 AM | Quebradora Giratoria Primaria (QG) | TIE |
| | Matutino | 2015-02-13 06:00 AM | 07:15 AM | Quebradora Giratoria Primaria (QG) | TIE |
| ▼ Detalle: Corriendo Vacío (2) | | | | | |
| | Matutino | 2015-02-13 07:53 AM | 07:59 AM | Quebradora Giratoria Primaria (QG) | TIE |
| | Matutino | 2015-02-13 08:47 AM | 08:55 AM | Quebradora Giratoria Primaria (QG) | TIE |
| ▼ Equipo: Transportador de Banda 1 (TB01) (2) | | | | | |
| ▼ Detalle: Corriendo Vacío (3) | | | | | |
| | Matutino | 2015-02-13 07:11 AM | 07:27 AM | Transportador de Banda 1 (TB01) | TIE |
| | Matutino | 2015-02-13 07:52 AM | 08:00 AM | Transportador de Banda 1 (TB01) | TIE |
| | Matutino | 2015-02-13 08:47 AM | 08:55 AM | Transportador de Banda 1 (TB01) | TIE |
| ▼ Detalle: Producción (4) | | | | | |
| | Matutino | 2015-02-13 08:54 AM | 12:05 AM | Transportador de Banda 1 (TB01) | TIE |
| | Matutino | 2015-02-13 07:26 AM | 07:53 AM | Transportador de Banda 1 (TB01) | TIE |
| | Matutino | 2015-02-13 07:59 AM | 08:48 AM | Transportador de Banda 1 (TB01) | TIE |
| | Matutino | 2015-02-13 06:00 AM | 07:12 AM | Transportador de Banda 1 (TB01) | TIE |
| ▼ Equipo: Transportador de Banda # 2 (TB02) (1) | | | | | |

Editar Campos de Fila

Fecha de Inicio

02/13/2015 07:14 AM

Fecha de Fin

02/13/2015 07:25 AM

Equipo

Quebradora Giratoria Primaria (QG)

Componente

Motor Trit. 1 Giratorio

Búsqueda de código de Paro:

Sin Movimiento

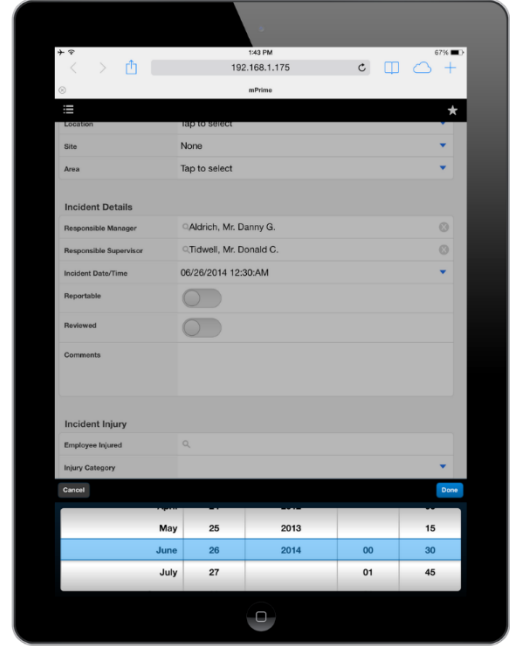
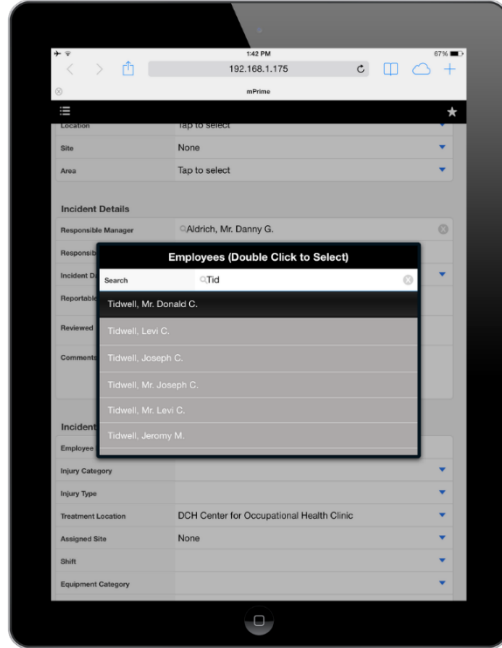
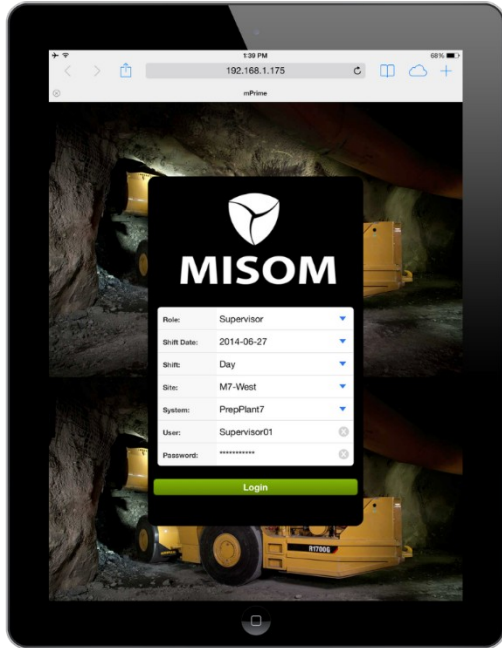
- ▶ TIEMPO DISPONIBLE UTILIZADO (TU)
- ▶ TIEMPO DISPONIBLE NO UTILIZADO (TNU)
- ▼ PARO DE EQUIPOS (PE)
 - ▼ MANTENIMIENTO NO PROGRAMADO (MNP)
 - ▼ RETRASOS EXTERNOS (REX)
 - Sin Movimiento
 - Acarreo
 - ▶ RETRASOS MECANICOS (RME)
 - ▶ RETRASOS ELECTRICOS (REL)

+

-

Codigo de Paro: **Sin Movimiento**

Comentarios:



Lesson:

ideal as a Manual

Supplement

of integrated data within a workflow

Aggregate Plant

Arizona, USA, 2015



Small Coal Mine

Wyoming, USA, 2015



- MIL STD 801F-516.5
IP 68
- Waterproof
- Hardened
- Inexpensive
- Removable





Uses AMPS universal
mounting systems
(sold separately)

Lockable for maximum
iPad mini security

Light Fleet Management (Quarry)

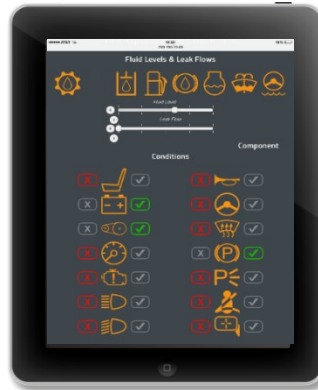


Light Fleet Management (Coal)

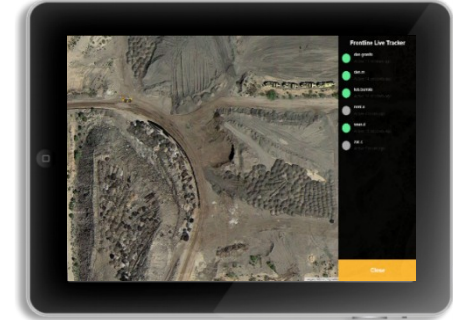




Fleet Management



Intelligent forms



Supervision



MISOM's FARA Application



Real-time Personal Performance

Lesson:

Think
Mobility

Current

Connectivity is key

FMS must remain on
machine

Pre-op on paper then
maybe computer

Reality

Communications will never
be perfect

People & machines can be
tracked (take the tablet)

“Walk around” for real &
more engaging FLHA

Elements of Gaming Addiction



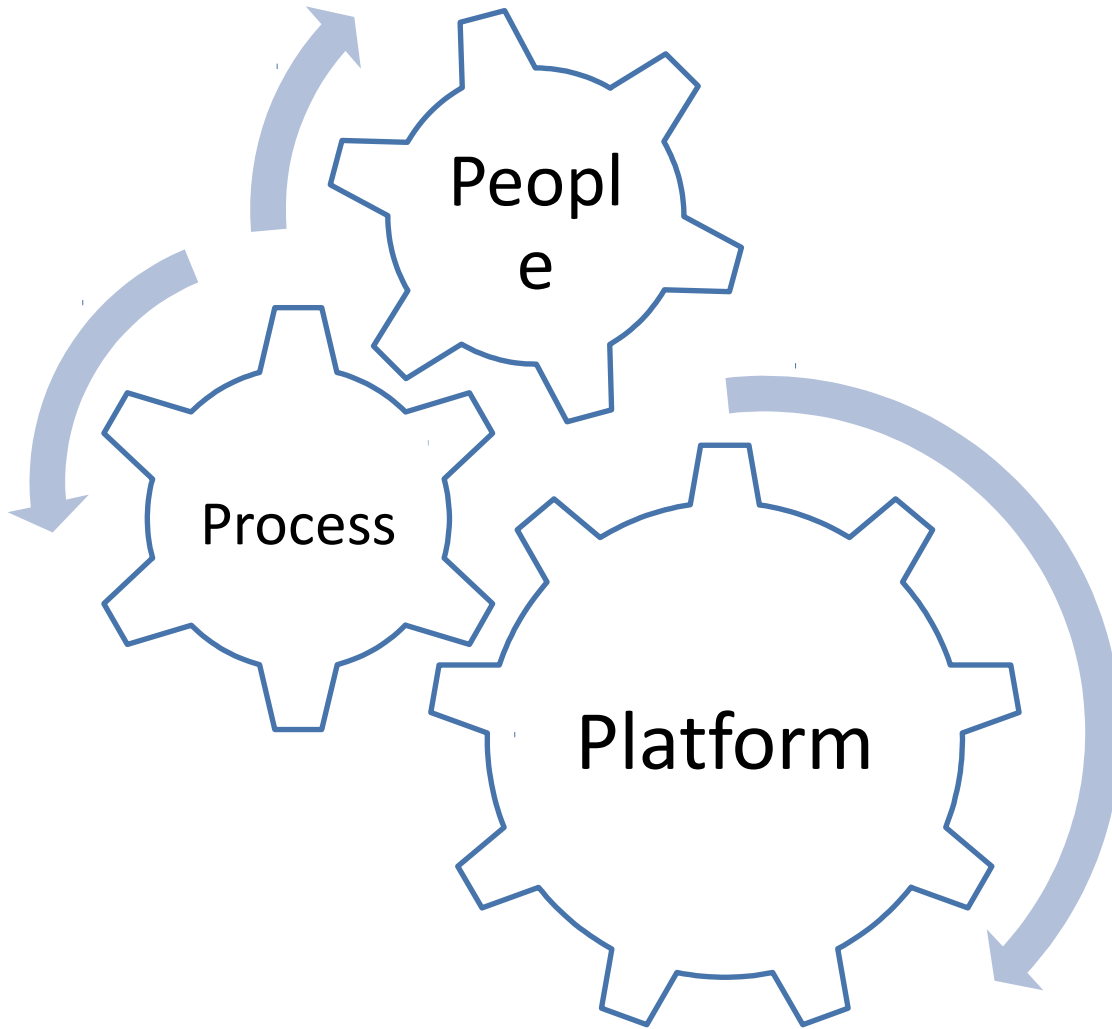
Frequent Achievements & Micro-awards w Feedback

Social Affirmation

Ease of Collection

Clean & Simple:
Progress, Badges, Leaderboards / Scoreboards

Access Ubiquity



Peopl
e

Process

Platform

Large thermal coal mine Wyoming,



| | |
|-------|-----------------------|
| Date | Monday, April 07 2014 |
| Shift | All |

HOME

| Key Performance Indicator | Actuals | Goals | Points Possible | Points Achieved | Last 30 Days % |
|---|----------|--------------|-----------------|-----------------|----------------|
| Incidents (first aid or any incident) | 0.0 | 0.0 | 20 | 20 | 64.5% |
| Coal Mined (Tonnes) | 6,107.0 | 5,890.0 | 10 | 10 | 71.0% |
| Total Production - Shovel/Excavator (BCM) | 75,469.4 | 85,566.0 | 20 | 0 | 0.0% |
| Production Meters Drilled | 1,640.2 | 2,370.0 | 20 | 0 | 6.5% |
| | | Total | 70 | 30 | |
| Leading Indicators | Actuals | Goals | Points Possible | Points Achieved | Last 30 Days % |
| Safety Interactions | 23.0 | 36.0 | 20 | 0 | 3.2% |
| Equipment Health Alarm | 2.0 | 0.0 | 20 | 0 | 3.2% |
| BCM/Shovel Ready Hour | 1,164.5 | 1,355.0 | 10 | 0 | 3.2% |
| Meters/Drill Ready Hour | 30.6 | 30.0 | 10 | 10 | 64.5% |
| BCM/Truck Ready Hour | 274.0 | 241.0 | 10 | 10 | 71.0% |
| AM Production BCM's (6am to 8am) | 4,327.0 | 5,350.0 | 10 | 0 | 3.2% |
| PM Production BCM's (6pm to 8pm) | 4,856.6 | 5,350.0 | 10 | 0 | 3.2% |
| Available hrs (Shovel) | 94.6 | 86.4 | 10 | 10 | 41.9% |
| Available hrs (Truck) | 359.2 | 394.4 | 10 | 0 | 54.8% |
| Available hrs (Drill) | 108.9 | 118.1 | 10 | 0 | 12.9% |
| Operational Delays (Primary Shovels) | 14.2 | 9.5 | 10 | 0 | 32.3% |
| | | Total | 130 | 30 | |

Shift Change

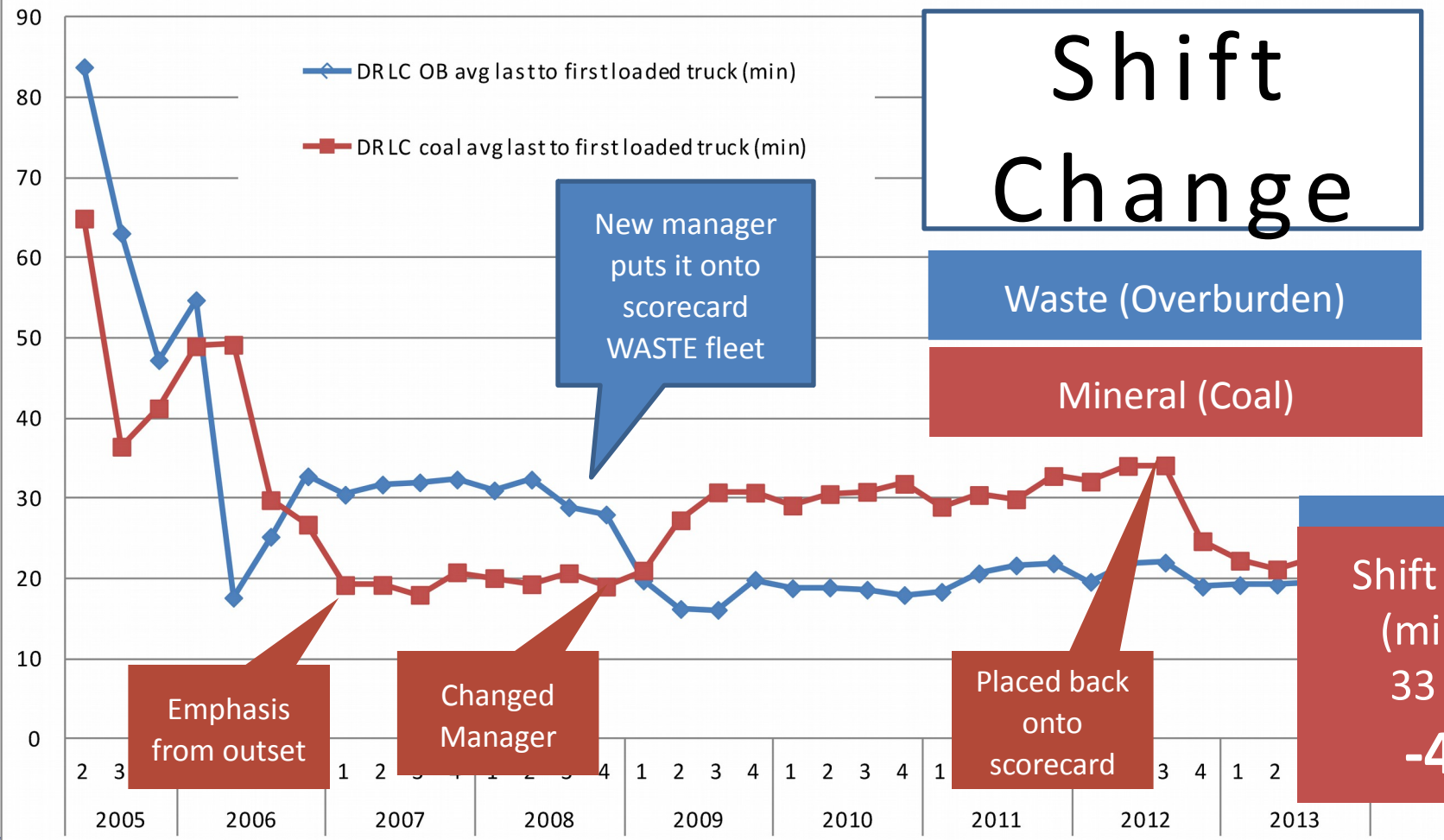
◆ DRLC OB avg last to first loaded truck (min)
■ DRLC coal avg last to first loaded truck (min)

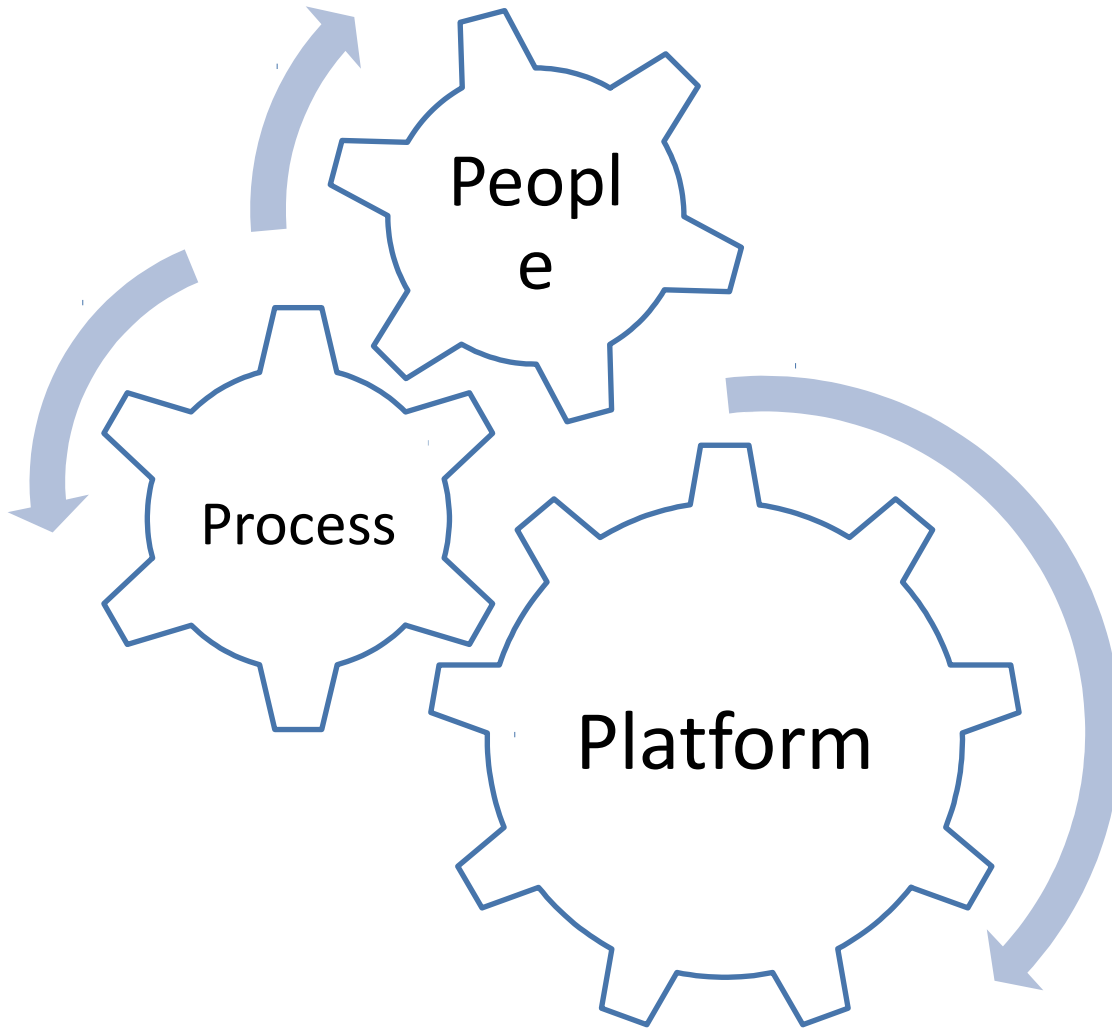
New manager puts it onto scorecard WASTE fleet

Waste (Overburden)

Mineral (Coal)

Shift Change (minutes)
33 → 23
-43%





Peopl
e

Process

Platform



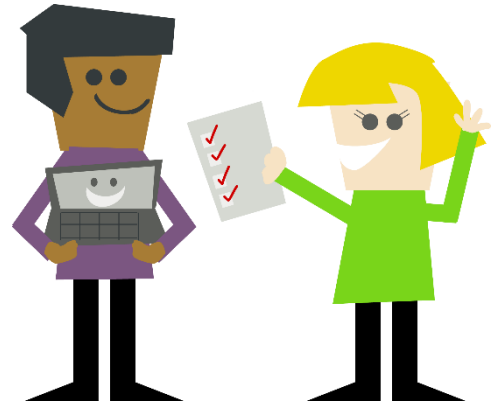
Feedback /
Interaction

+



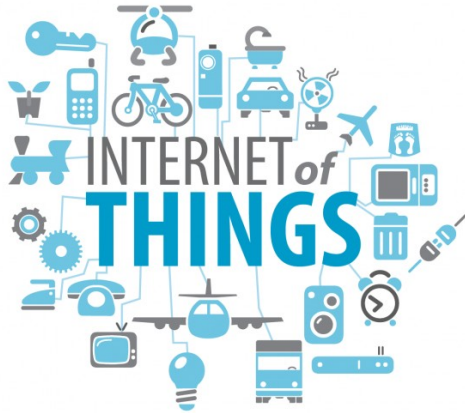
Social

=



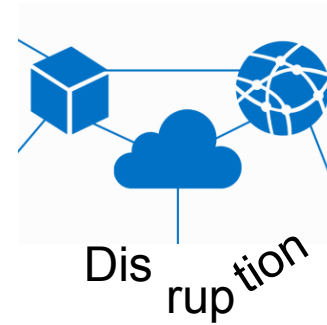
Engagement

Coming Soon



Wearables
Nearables
Cloud

Low-cost tracking



APIs
APIs

Effective use of data...
Effective use of data...
Cloud - IoT - Analytics
Cloud - IoT - Analytics
Solutions could be 1/10th
Solutions could be 1/10th
the cost of current tech
the cost of current tech

Conclusions

Mobile = Tracking
&
Information
&
Engagement

Tracking & information
ubiquity in our personal
lives...

...why not in our mines?

Vast amount of **paper**.

Currently, very **low use** of **data** (minimal analysis)

Slow entry of **mobile alternatives** to legacy systems

...but it is **part of the future** data-rich world...

What we need:

Education^{al} & cultural readiness for **Analytics**.

More mobile & internet of things

...we are part of the **data rich world**...

...the next generation of employees **expect it**.

